The Builder.

VOL. LXXXI.—No. 3056. AUGUST 31, 1901.

ILLUSTRATIONS

Lloyds Registry of Shipping, Fenchurch-street.—Mr. T. E. Collcutt, F.R.I.B.A., Architect ..... *Double-Page Ink-Photo.*
"Houghton," Norfolk: the Entrance Front ..... *Single-Page Ink-Photo.*
Mural Fountain, Bowood, Wilts ..... *Single-Page Ink-Photo.*
Details of Great Hall, Winchester School ..... *Double-Page Photo-Litho.*
Cupola, Queen's College, Oxford.—Drawn by Mr. Edwin Forbes ..... *Single-Page Ink-Photo.*
Old House, Ludlow.—Drawn by Mr. Edwin Forbes ..... *Single-Page Ink-Photo.*

Blocks in Text.

A Sundial from Wrest ..... Page 187
Welsh Calvinistic Methodist Chapel ..... „ 193
Lloyds Registry of Shipping, Fenchurch-street. Ground Floor Plan .. Page 194
Illustrations to Student's Column ..... „ 197

CONTENTS.

The English Renaissance 185
Notes 187
Machinery at the Glasgow Exhibition 189
An Old Builders' Guide 191
Welsh Calvinistic Methodist Chapel 193
The Architectura Association: Fifth Summer Visit 194
Illustrations:—
Lloyds Registry of Shipping 194
"The English Renaissance" 194
Cupola, Queen's College, Oxford, and Old House, Ludlow .. 194
Bristol and Gloucestershire Archæological Society 194
Books Received 196
The Student's Column.—Gas and Gas Fittings—9. 196
Correspondence:—
The Late Mr. Brydon's Government Offices 197
Architectural Courts at the Crystal Palace 197
Obituary 198
General Building News 198
Sanitary and Engineering News 199
Foreign 199
Capital and Labour 199
Miscellaneous 199
Legal:—
A Building Dispute Settled 200
Building Dispute at Newcastle 200
Building Dispute in the City 200
Recent Patents 200
Some Recent Sales of Property 201
Prices Current of Materials 201
Tenders 203

The English Renaissance.

THE monumental work on the architecture of the English Renaissance,* on which Mr. Belcher and Mr. Macartney have been at work for some time, and the first numbers of which have already been noticed in our pages,† has now appeared in complete form in two large and handsome folio volumes. We are still of opinion that the title of the book is a misnomer, and is confusing our architectural nomenclature. The period selected commences with the work of Inigo Jones, and that, in our view, was the commencement of Renaissance architecture in England. The sub-title runs "Domestic Buildings erected subsequent to the Elizabethan Period." "Domestic buildings" is not a strictly accurate definition, as the works illustrated include Greenwich Hospital, Trinity College Library, Abingdon Town Hall, and other buildings which are certainly not domestic. That is a minor matter: but the special reference to "Elizabethan" implies that the authors consider Elizabethan as Renaissance architecture, and the work commencing from Inigo Jones as "later Renaissance." Now we entirely decline to regard Elizabethan as "Renaissance" architecture. It is Elizabethan, and it represents a phase of architecture peculiar to this country, which is not to be found elsewhere and which is much better distinguished by the term hitherto conventionally assigned to it. Elizabethan architecture is a picturesque possession of our own; it is not only peculiar to England, but it arose out of circumstances peculiar to England. The Perpendicular Gothic which immediately preceded it is also an indigenous phase of architecture, represented by nothing on the Continent. Elizabethan architecture is the result of the reminiscence of that phase combined with the echoes of the Italian Renaissance movement which, in consequence of the insular position of this country and the slow travel of artistic influences with us in those days, reached us at first only in a piecemeal manner, and affected details without affecting the English style of architecture as a whole. Hence this reposeful, rich, picturesque *mélange* of late Gothic and patchwork Renaissance detail which we have learned to call Elizabethan, and which is an essentially distinct thing from Renaissance.

For the distinction is not one of words only; it concerns the whole architectural treatment of a building—the whole conception of architecture as an art. Renaissance architecture means the forms and principles of Classic, and especially of Roman architecture, which followed in Italy the revival of classical learning. And, apart from the mere revival and imitation of the Classic orders, which is its outward and visible sign, it means the conception and treatment of a building as a uniform whole, dominated by one paramount idea which has its basis in the plan, and which rules the whole design. Now Elizabethan architecture never rose to that intellectual height. Its plans are for the most part naïve, and deficient in unity of conception. The real power of Renaissance architecture lay in this, that it grasped the conception of a building as one whole and symmetrical idea. We neither forget nor underrate all that modern architectural criticism has had to say in regard to the deadening and academic effect of the Classic revival and its adherence to precedents of antique detail; of its unsuitability to our climate; of its want of life and variety in comparison with mediæval detail. In all that criticism there is much truth. But the great thing which the Renaissance revival brought with it was this power of unity of architectural conception. Italy brought it to the modern world; and a century or so later Inigo Jones brought it to England. We never had it before him. His plan of Whitehall Palace was a kind of architectural conception of which there is no previous example on our shores. He was the leader of the English Renaissance.

Therefore, the title of the book before us should have been "Renaissance Architecture in England." What would be properly called our "later Renaissance" would be the Georgian architecture—also peculiar to this country, and which represents the decadence of the Italian Renaissance—dry, stiff, and formal; destitute of the large manner and dignity of the Renaissance in its pristine vigour, though it still retains some of the Renaissance characteristics of unity and comprehensiveness of design.

An illustrative book of English Renaissance architecture, in the true signification of the word, would to our thinking be more instructive if the examples were arranged in chronological order. No attempt has been made at this in Messrs. Belcher and Macartney's book. The dates of nearly all the examples illustrated are known and are given; but the sequence of the illustrations has no reference whatever to date. This we cannot help also regarding as a defect in the book, though it is one very characteristic of the present day. In this as in other cases, to produce a collection of fine illustrations seems to be the principal aim, without taking any trouble to arrange them in such an order as to be historically illustrative. It would have been so exceedingly easy to do this, being merely a question of arranging or numbering the plates according to the sequence of date, that one can only suppose that the authors considered it of no consequence; a conclusion in which we cannot agree. One object of such a collection should be to illustrate the development and decadence of a style; not merely to bind together a series of illustrations without method or system.

These are the defects of what is nevertheless a very fine architectural publication, containing a collection of examples illustrating almost all the types of English Renaissance architecture, from the palace to the street house. In their Introduction, the authors do not omit to recognise the quality of unity of design which we have alluded to as one of the most special characteristics of Renaissance architecture. Among its developments, they observe, "there is the bringing to maturity the well-balanced design; a complete project, with every part rightly ad-

* "Later Renaissance Architecture in England; a Series of Examples of the Domestic Buildings erected subsequent to the Elizabethan Period." Edited, with introductory and descriptive text, by John Belcher, A.R.A., and Mervyn E. Macartney. London; B. T. Batsford; 1901.

† See *Builder* of July 16, 1898.

justed and with carefully considered outline. It was this striving after unity, which may be said then to have reached its most complete development; indeed, it went beyond the mansion and extended to its environment." There could not be a finer example of this feeling in architectural design, which includes the placing and grouping of the buildings as well as their detailed architectural treatment, than is to be found in Wren's working out to its completeness of the plan of Greenwich Hospital, which forms the first illustration in the book. The wide spacing of the two front blocks, leaving the rear blocks partly visible behind them, and the introduction of the domes at the inner angles of the latter, so as to bring them into full view from the front quadrangle, combine to form one of the stateliest of plans; and although a dome seems naturally and generally a central feature, we are reminded here how it may be effectively used at an angle of a block of building. In fact, without following any precedent, Wren placed his principal features here exactly where they would be most effective in relation to the whole scheme. Take away the outstanding front blocks, and the domes might seem to be weakly placed—one might think that they ought rather to be in the centre of the entrance façades. Taken in connexion with the whole plan, they are exactly where they ought to be, forming prominent objects as seen from the great front court, and standing as a stately commencement or portal to the narrower avenue between the two rear blocks. While referring to the plan, however, we cannot but comment upon the difference between this and some other recent architectural publications, in the matter of plans, as compared with the practice of earlier architectural illustrators. Campbell in the "Vitruvius Britannicus" gives all the plans on the same scale as the elevations. Here, as well as in Mr. Gotch's recent publication, we have no plans except small-scale blocks in the text; and the principal illustrations are not elevations but photographic views. We have no quarrel with these latter; by their means the reader is given a vivid idea of the actual look and character of buildings which he may never have seen; but we should certainly think it more complete if they were accompanied by plans to a large scale. The lack of these is another indication of the spirit of architectural illustration in the present day; it is all concerned with the picturesque effect of a building, not with illustrating its working out. We see the same at the Royal Academy, where architects are content to send, if any plan, merely a diminutive one in a corner of the drawing, and perhaps would not be accepted if they attempted anything else; whereas in France the plans are exhibited to the same scale as the elevations; and it would be the same in a French architectural publication. In this respect we have fallen below the level of Campbell and Kent; in a modern publication it seems to be sufficient if there is a plan just large enough to form a key to the general meaning of the photographic view—a plan, too, dissociated from the view and relegated to a back place in the explanatory text. That is certainly not an ideal system of architectural illustration; but it is what appears to suit the present demands.

In studying the illustrations of the buildings of a past age, we should endeavour to criticise them as we would criticise modern work, not to adopt an attitude of indiscriminate admiration. In this respect the remarks on the various examples are in a right spirit; the authors do not scruple to point out what they consider the defects and shortcomings of some of the buildings illustrated. The criticism on "The Great House, Burford"—the incongruity of effect of the vases planted on the top of the battlements, and the indiscriminate manner in which a pediment is got in, to break the line, without any constructional basis, is quite to the point. In fact Burford, as they remark, "is an example of the overlapping of Early and Late Renaissance work," or (as we should prefer to put it) of Elizabethan and Renaissance work; the general design is Gothic in feeling, but the newly arrived vase terminals of the Renaissance have been perched on it. We cannot agree with the comparative criticism as to Wilton House and Houghton. The authors say that "the Houghton front lacks the quiet dignity of Wilton, where more restraint is exercised in every part." Restraint may be carried too far, and we confess that we think Wilton rather over-rated; the name of Inigo Jones has cast a glamour over it. Its simplicity is pleasing no doubt, as well as the contrast afforded by the one bit of sculptural decoration introduced in the centre, but the end pavilions are very deficient in dignity. We have reproduced the view of Houghton (see plate), and we do not understand the meaning of the want of "restraint" complained of. With the exception of the cupolas, it can hardly be more simple, and it has a palatial dignity which is wanting in Wilton. The house, we are told, was designed by Campbell in 1723, but carried out by Ripley, who substituted the domes for the originally designed attic at each end. He certainly thereby made an improvement, and the whole effect is that of one of the most dignified mansions in England, and one which shows, too, what may be done in Renaissance architecture by the mere treatment of wall, windows, and cornice, without the decorative use of an order of columns or pilasters. Again, somewhat too much is surely made of Groombridge. It is a mean-looking brick house, with its high-pitched roofs and plain overhanging eaves; and the columned portico, so far from giving it the dignity it lacks, seems out of keeping with the rest of the elevation. Nor can we concur in the admiration expressed for the ceiling decorations of the drawing-room, said to be the one room of sumptuous character which the house possesses. The great ragged mass of realistic plaster fruit and flowers, running round the central oval compartment, has no redeeming quality but its boldness; it is bad ornament, with no principle of design in it at all, and entirely destitute of refinement. It has had imitators, however, in recent work. If people will imitate old Renaissance detail, let them at least imitate its beauties, not its faults. As an example of a far superior type of English Renaissance detail we have reproduced the plate of details of the Winchester School Hall, by Wren. We do not by any means agree that Wren always used "swags" and that kind of ornament well; there is no doubt, for instance, that a great deal of the exterior carved ornament of St. Paul's, in the way of floral festoons, is coarse and poor, as Ruskin has justly remarked; and good or bad, there is always the question whether it is really Wren's design, or only that of his carvers working out their own will in their own way. But in the case of the Winchester Hall there is no doubt that the disposition of the swags, forming a kind of frieze ornament, is Wren's own, and is very effective; and there is a severity of line about them, as shown in the detail drawing, which is very creditable to the carver, and far superior to the exuberant vegetation of the Groombridge ceiling. The treatment of the door and windows, for plain and simple work, can hardly be surpassed in dignity and refinement.

The employment of the order as a decoration, however we may theoretically condemn it, cannot be dissociated in the mind from the highest achievements of Renaissance architecture. For a building in this style of the largest and most imposing class, the use of the columnar order is really the condition of the greatest dignity of effect, as many of the illustrations in this book do practically testify. It may be misused, as it certainly is at Stoneleigh, where the majority of the treatment consists of windows and window dressings only, but where each angle of the building is formed by a great square fluted column or angle pilaster, running nearly the whole height of the building, with an Ionic capital. A modern architectural student who did this in a prize competition design would be condemned at once, both by his teachers and by most of his fellow students; it is absolutely bad; and yet one cannot exactly regret its existence in this instance; it is an interesting curiosity, and a variety from the general use of the order, and it gives a certain individuality to the building; only let not the young architect go and do likewise. On the other hand, in the plainer forms of domestic architecture, there are many examples in this book showing how much of dignity, and how much of the true and best characteristics of Renaissance architecture, may be realised without the introduction of the order. Houghton, already referred to, is an example on a large scale; an admirable example on a smaller scale in a less ambitious building, is that of Tyttenhanger. We entirely concur with the authors in their admiration for this house, which is an ideal specimen of architectural good taste and refinement displayed in a simple and severe manner and almost without the use of ornament. Another example is Inigo Jones's Raynham Hall, with its fine free design in the scroll gables; the authors call attention to one charming little detail in this, viz., the termination of the scrolls, just under the horizontal cornice, with a diminutive Ionic cap; a playful incident which in itself shows the original mind of the designer, and which seems to give the scroll the effect of supporting or, as the authors put it, "lifting" the gable. There is a good deal of general resemblance between the style of Raynham and that of a less well-known example, Swately Hall, in which the treatment of the gables is very similar, though the house as a whole has not the fine simplicity of Raynham. No architect's name is connected with it. In reference to Raynham, we may draw attention to the singularly delicate and graceful treatment of the doorway, shown in a separate plate to a larger scale, and especially the carved ornament over the door, which has a cha-

racter of its own, different from that of the usual Renaissance carved ornament.

Out of the ordinary type of Renaissance ornament is also the carving in the semi-circular lunette over a door in Ashburnham House (Plate 20)—so much so that one is surprised to find no comment on it in the text. Though the detail of the leafage is Classic, in its general effect it reminds one of mediæval work.

Among the plans given in the text there is perhaps none of greater interest than that of Fenton House, Hampstead, originally known as the Clock House, probably from a clock which once occupied the circle in the blank window-space over the entrance. The architectural character is of the simplest—a brick house with plain flat-arched windows. The plan in its outer lines is a simple square, but the way in which it is divided up shows the hand of a genuine architect. A recessed porch with two columns is obtained in the centre of the entrance front, and the internal space on either side of this is turned into a closet on one side and an alcove on the other, opening respectively out of boudoir and study, which are lighted from the side. A similar contrivance is repeated with the back rooms, the closets or alcoves both in front and back going behind the fireplaces, which are thus kept away from the outer walls and from the influence of cold conducing to bad draught. This little plan is quite a study in its way. In the matter of chimneys the authors draw attention in another place to the manner in which architectural effect is combined with practical advantage in the massive treatment of the chimneys at Coleshill (Berkshire); "the size of the stack has no doubt insured (*sic*)* the warmth of the flues, so that no pots are required to make them 'draw' well." As a whole, Coleshill is a very fine house, another of the examples of Renaissance dignity obtained without the use of the order; in its general effect it may be compared with Houghton, though on a smaller scale and wanting the accentuation of the angles. The back entrance gateway, with its busts in circular niches, is singularly fine and dignified in effect, and unlike any other gateway of the kind that we can recall.

We do not altogether share the authors' admiration for the Radcliffe observatory. It is true that it is original and that its originality grows naturally out of the requirements of the plan, but on the whole it is rather a clumsily managed pile. The use of terracotta plaques as ornaments on the walls is a hint which might have received more attention. Bowood, Wilts, though the architecture taken in detail is not remarkable, is a fine example of the architectural grouping of house and garden in one design, and is well illustrated in this sense. We give a reproduction of the plate showing the mural fountain in the garden, not because there is anything of particular value in the architectural detail, but because the whole makes so fine a picture.

In spite of some mistakes which we have noticed, as to the view of Renaissance architecture implied in the title, and as to the small part which is given to plans in the illustrations, this is one of the most remarkable and fascinating works in architectural illustration which has appeared in our time. As before observed, the fine photographic illustrations from the actual buildings have all the effect of bringing them before us; and the number of examples of bold, fine, and monumental work thus brought before the eyes has a quite inspiring effect as we turn the pages. The work will probably not be without a considerable influence on the younger generation of architects. It should be added that in every respect of paper, printing, and general make-up and execution, the book is worthy of its great subject.

* "Ensured" is the correct expression in modern English, though "insured" was formerly used in the same sense. There are some other slips of language; it is odd that few architectural books are without them.

A Sundial from Wrest.

NOTES.

St. Paul's Cathedral.

IN a letter to the *Times* of Tuesday last, Dr. G. Johnstone Stoney, brother of Dr. Bindon B. Stoney, the well-known engineer, suggests that the subsidence which has been going on more or less since St. Paul's Cathedral was built is chiefly due to the removal and rearrangement of material by water travelling laterally through the lower layer of sand and over the surface of the London clay. It is undoubtedly the fact, as Dr. Stoney states, that underground water always exercises a solvent action on the mineral constituents of the material encountered, and is also to some extent responsible for the rearrangement of gravel, and the washing away of clay. He might have added that fine particles of sand are often carried away by the underground flow of water, an effect amply evidenced when pumping is practised in sandy soil. Dr. Stoney points out that any subsidence, attributable to causes such as those mentioned, must obviously be variable, as water generally chooses special paths in making its way from one place to another. The remedy which he proposes is to prevent any water from having access to the layer of sand immediately above the London clay by an intercepting sewer, probably best placed to the north and east of the cathedral, and by stopping the downward percolation of surface water to the same sand layer. Assuming this treatment were adopted it would be necessary to fence off a large area by sheet-piling as a first precautionary measure, and then to form a huge retaining wall or dam in addition to the drain. These works might possibly be conducted by closing St. Paul's Churchyard, but it is not improbable that operations would have to be extended into two or three adjacent streets. In either case the direct cost and the indirect loss to the community would be very great, and the further work of rendering waterproof the whole of the ground about the Cathedral would prove to be an equally expensive undertaking. Perhaps the proposed remedy might be effectual, but on this point we do not feel at all certain. One result that would inevitably follow would be the complete draining away towards the south of water now contained in the interstices of the sand layer. This process might possibly be attended by some futher settlement, although it may be reasonably held that the pebbles or grains of sand ought to be self-sustaining in a dry state. In any case, we think the course of treatment foreshadowed by Dr. Stoney is hardly practicable in the centre of so busy and closely built a city as London. A much more feasible and satisfactory scheme is to underpin the foundations of the cathedral, as suggested a week or two ago by Mr. Reilly. As the London clay is to be found at a depth of about 35 ft. from the surface, there would be no difficulty in providing the foundations of St. Paul's with means of support such as would be unaffected by hostile influences, whether of natural or artificial origin.

St. Bride's Church, Fleet-street.

A CLEARANCE which has been made for the re-building of St. Bride's-avenue on the south side of Fleet-street, affords for the while a good view of the church. Some alarm has been taken at the construction of some scaffolding around the upper portion of the steeple. We are enabled to state that a "steeple-jack" was lately employed to make an inspection of the fabric, and consequently upon his report it was deemed advisable to construct a staging for an examination to be made by Mr. R. Cuninghame Murray, architect to the vicar and churchwardens, of the third stage (counted from the tower) of the steeple. Mr. Murray has not yet drawn up his report. The custodians of the church, however, are apprehensive about the condition of the stonework of the third stage. Its eight arches, open to the weather, are tied within by iron clamps that pass through the stonework at the angles of the octagon; it is feared that the accumulation of rust from the corrosion of the iron bars is gradually tending to loosen the joints and to leave the stones slightly apart. Wren began the rebuilding of the church in 1680; the tower and steeple as originally built by him, in 1701-3, rose to a total height of 234 ft.; on June 18, 1764, it was struck by lightning and so greatly damaged that it was found necessary to take down and reconstruct 85 ft. of the masonry. In repairing the injury (at a cost of 3,000*l.*) Sir William Staines lowered the spire by 8 ft. In 1803 the steeple was again struck by lightning. In the storm of Friday, July 15, 1887, it narrowly escaped destruction by a memorable stroke of lightning which however expended its force beneath the stone paving at the base of the tower. The fastenings of the conductor, which had become worn and insecure, were then repaired, and in 1888 the outer stonework of the tower and steeple was repointed and reinstated. The opening of St. Bride's-avenue into Fleet-street was designed by J. B. Papworth, at a cost of about

10,000*l.*, in place of Bride-passage, a narrow alley which was consumed by the fire in Fleet-street on November 14, 1824. See the woodcut in Hone's "Every Day Book," vol. i., cols. 87-8.

Innerpeffrey Castle, Perthshire.

We hear that Colonel Hay is about to carry out a restoration of Innerpeffrey Castle, after designs prepared by Mr. George T. Ewing, of Muthill. The castle, situated on the north bank of the river Earn, and about four miles distant from Crieff, was built by the Honourable James Drummond, created Lord Maderty, a few years before his death in 1623. The castle, L-shaped on plan, with a square tower, which contains a newel staircase from the ground to the top story within the re-entering angle, presents an interesting example of a period when Scottish lords began to build their castles as much for peaceful occupation as for purposes of refuge and defence. Nevertheless, at Innerpeffrey some features of the older military architecture were adopted—for instance, the outer wall, the narrow loop-holed openings on the ground floor, and the shot-holes from the kitchen that cover the door. In the vaulted ground floor are the storerooms, larder, cellars, and kitchen, with, it would seem, a secret stair from one of the cellars to the hall. The principal floor contains the hall, measuring 32 ft. by 20 ft. and lighted on three sides, a private room with garde-robe, and a bedroom beyond. The rooms on the floor above are similarly disposed, but each of them is entered from the staircase, of which the steps are carried up to the attics above; the gables are crow-stepped. The neighbouring chapel, lately reinstated, formed during many generations the chief burial place of the house of Drummond.

The British Museum.

In the annual statement presented to the House of Commons respecting the affairs of the British Museum it is notified that, in the Department of MSS., the purchase of the third portion of the Buckler collection of architectural drawings completes a transaction which secures for the department an unequalled series of sketches of buildings and architectural details from all parts of England and Wales, made by three generations of the Buckler family (especially by John Chessell Buckler) during the past century. As a record of the state of the ancient buildings of this country at the period named these drawings, which fill nearly 100 volumes, are of special value to the national collection. Mention is also made of the acquisition, in the Department of Prints and Drawings, of 113 drawings and three sketch-books of topography and costume, executed in pencil and water colours by George Scharf, sen., illustrating chiefly London houses, shops, and street musicians, the rebuilding of the British Museum, and military uniforms; also forty-five drawings, mainly views of old buildings in Westminster, by Sir George Scharf, by whom they were bequeathed to the Museum.

Donington Park, Leicestershire.

This ancient property of the Rawdon family, extending over 5,090 acres, will shortly be offered for sale by auction. The estate, which yields a rent-roll of about 8,500*l.* per annum, comprises a park of some 400 acres, bounded by the Trent, famous for its beautiful scenery, its herds of red and fallow deer, and its fine old oak trees. The south front of the mansion was constructed of stone quarried upon the estate. The east wing forms the chapel, measuring 58 ft. by 20 ft. On an eminence near the village of Castle Donington, in the extreme north-western corner of the county, are the remains of a castle that had been built, upon the site of a former one, by Henry de Lacy, Earl of Lincoln, who died in 1310, and was again rebuilt by George (Hastings), fourth Earl of Huntingdon, who in 1595 had bought it from Robert, Earl of Essex. In 1795 Francis, second Earl of Moira and first Marquis of Hastings, enlarged the residential portion of the house, which had been the home of his ancestress, Selina, Countess of Huntingdon, celebrated for her association with the Methodists, whose daughter, Lady Elizabeth Hastings, brought Donington, together with the Baronies of Hastings, Hungerford, &c., in marriage to John (Rawdon), first Earl of Moira. In some cottages on the estate are vestiges of the hospital founded by John de Lacy (who died, 1179, in Palestine), Constable of Chester, for a master and thirteen brethren and sisters, which he dedicated to St. John the Evangelist.

Electric Wiring Rules.

The paper on wiring rules by Mr. F. Broadbent, which has just been published in the *Journal of the Institution of Electrical Engineers*, severely criticises many of the codes of rules issued by supply companies and fire offices. It would undoubtedly save a great deal of needless trouble if the code of rules issued by the Institution of Electrical Engineers was universally accepted. In our opinion, this code is far from perfect, but it has the merit of being brief and treating only of important points. Many of the fire office rules magnify unimportant details, and their recommendations sometimes even increase the fire risk. For example, some of the rules say that motor-starting resistances must be fixed on stone or brick walls, and one even goes so far as to insist that they must be placed "outside of the building." Mr. Broadbent points out the absurdity of this rule by instancing a printing establishment employing a hundred motors. If the resistances were fixed outside we should require at least 2,000 connecting wires, and the fire risk would be most decidedly increased. Again, many corporations make very stringent regulations about the maximum permissible starting current of a motor, but none apparently make any objection to the current being switched off at any instant, although the blink in neighbouring glow lamps caused by a sudden rise of pressure must considerably shorten the life of the lamps. Companies fine consumers by means of their maximum demand indicators for taking too much current for a short period, and they prove to every one's satisfaction that this is an equitable arrangement. It seems to us that companies ought to be fined whenever their pressure of supply rises too high, as this spoils the lamps in the circuit. It is unfair that the fines should all be at the expense of the consumer.

Sanitary State of Alcester and District.

Dr. S. Monckton Copeman, in a recent Report to the Local Government Board on the general sanitary circumstances and administration of the Alcester, Warwickshire, Rural District, mentions that water-closets, except in Alcester, are almost unknown throughout the district, the methods of excrement disposal comprising the use of pails, to which, in some instances, dry earth or ashes are supposed to be added, and ash-pit privies. At Alcester, Studley, and Bidford, the removal of ashes and of excremental and other refuse is carried out by scavengers under contract with the District Council. The following are Dr. Copeman's conclusions in this connexion:—

"It would be well that the Rural District Council should as soon as possible make arrangements for the periodical removal of excremental and other refuse in all the larger villages. Probably also increased efficiency in the manner in which the work is carried out would be attained if the Council took the matter entirely into their own hands, instead of farming it out to contractors. But in any case, where scavenging is carried out, they should insist on collection at sufficiently frequent intervals, and so prevent any accumulation of refuse in the neighbourhood of houses."

The Report supplies evidence as to overcrowding in several of the villages, and in regard to Alcester itself we may quote the following remarks, which, we fear, are applicable to many other towns and villages in the country:—

"At Alcester, the building of new houses is almost at a standstill. In one block of buildings in Gas House-lane, most appropriately known as the Rookery, I found that overcrowding existed to a very serious extent. In support of this statement it may be mentioned that on making inquiries at several adjoining cottages on the Gas House-lane side of the block, I learnt from the inhabitants that the bedrooms, of which each cottage possesses two, having a total air capacity of only about 1,000 cubic feet, had to afford at night sleeping accommodation for the number of persons noted below:—1. Husband and wife, with nine children varying in age from sixteen years to three months. 2. Husband and wife, with five children varying in age from twelve years to one year. 3. Husband and wife with six children varying in age from twelve years to two years."

The Duke of Westminster Memorial, Westminster Abbey.

Workmen are now engaged in removing the stained glass from the great rose window in the south transept of Westminster Abbey. This glass, known as the marigold glass, dates from 1847, and has always in our opinion very much detracted from the view from the north transept, overpowering with the brilliancy of its colours the setting which it was intended to adorn. It is to be replaced by the new Duke of Westminster memorial, a scheme that includes all the glass in the south wall of the south transept. The design for the new glass is in the hands of Mr. G. F. Bodley, A.R.A., and we understand that Messrs. Burlison & Grylls, who are doing the work, will have it completed before the Coronation. The centre of the rose is to be filled by a figure of Christ, while the radiating lights will be occupied by angels and the Virtues, Old Testament and pre-Christian characters. We cannot speak of modern stained glass with unguarded enthusiasm, but the position that this memorial is to occupy ought to be a sufficient guarantee that the best that is possible will be done.

The New Government Offices.

We are very glad to see that the *Times*, in a leading article in its issue of Monday last, has spoken out strongly on the subject of the Office of Works carrying out Mr. Brydon's building without an architect. The article

comes rather late in the day, but now that it has appeared, it is everything that we could wish. The whole case is put very strongly, and on quite the right grounds; and we can hardly doubt that such an article in the *Times* will have its effect on public opinion.

MACHINERY AT THE GLASGOW EXHIBITION.

Whilst there are several buildings of comparatively small size in the Glasgow Exhibition devoted to mechanical appliances of different kinds, the bulk of the exhibits coming within this class are collected together in the Machinery Hall. This building, therefore, forms a natural starting point for visitors who are interested in engineering work. The Hall is 500 ft. long by about 300 ft. wide, comprising five bays, and with its annexes covering an area of about five acres. The roof of the central bay has a span of 108 ft. and a height of 54 ft.; it is supported on steel latticed columns spaced 8 ft. apart and disposed in pairs on either side of each principal. Arched girders extend from one end of the building to the other, having a span of 41 ft. 6 in., corresponding with the longitudinal spacing of the supporting columns. Cantilevers are built around each pair of columns for the support of the 16 ft. wide gallery running round the Hall at a height of 12 ft. above the floor level, and of double lines of shafting for actuating machinery. As the site of the building exhibited a rise in one direction, excavation was necessary in order to provide a level floor space, and retaining walls were required along two sides to prevent injury to adjoining roadways. The foundations of these walls were sunk through mud and silt to a solid bottom in order to avoid damage to adjacent property and to ensure the stability of the structure. At one end of the main building is the dynamo-house, about 100 ft. square, and communicating with this is the boiler-house, 204 ft. long by 70 ft. wide. The floor of the latter is sunk to a convenient depth so that visitors can command a good view of the steam generators and auxiliary appliances from a gallery on a level with the floor of the main building. For the purpose of driving the machinery intended to be operated in the Exhibition it was estimated that about 5,000 horse-power would be required, and the supply of motive force is furnished by the aid of several types of steam boiler.

Messrs. Penman & Co., of Glasgow, have four Lancashire boilers in operation, each 30 ft. long by 8 ft. diameter, working at a pressure of 120 lbs. per square inch. These boilers furnish steam to such exhibitors as require a moderate pressure, and the service-pipes (equalling a total length of over 1,000 ft.) are of wrought iron or mild steel with cast-iron connexions, the pipes being laid in timber-lined channels below the flooring. The whole of the controlling valves, steam separators, steam traps, and expansion joints were lent by the Glenfield Company, of Kilmarnock. A main flue situated behind the four boilers serves to collect the products of combustion, which pass through a Green's Economiser of 192 tubes, thus heating to a temperature of from 550 deg. to 700 deg. Fahr., the water employed for feeding the boilers. A small independent engine is situated on the top of the Economiser for driving the mechanical scrapers designed to remove soot as fast as it is deposited on the surface of the tubes. By the employment of such an apparatus it is well known that a very considerable saving of fuel may be effected without impairing chimney draught, but unfortunately many public bodies are still to be found who permit financial considerations to exclude the advantage in question from the buildings under their control. Beyond the Economiser is an induced-draught plant, installed by the Sturtevant Engineering Company, comprising a direct-driven fan built in brickwork at one side of the main flue, and connected therewith by suitable suction and discharge ducts. The fan is driven at a speed of about 450 revolutions per minute, its effect being to materially increase the volume of air passing through the boiler furnaces. By the aid of this arrangement cheap forms of fuel may be employed, and the cost of chimney shafts may be materially reduced. Next to the Lancashire boilers mentioned above is one of Messrs. Davey, Paxman, & Co.'s Economic boilers, 14 ft. 6 in. long by 8 ft. 9 in. diameter working at a pressure of 160 lbs. per square inch. This type of boiler has return fire-tubes above the furnace, and after passing through these the hot gases are led along each side and under the bottom of the boiler before entering the back flue. At one side of the boiler is a Paxman superheater having dampers which are operated from the front, and a Green's Economiser is installed in connexion with the main flue. Water-tube boilers of three types are also used for the generation of steam at 160 lbs. per square inch. There are two Stirling water-tube boilers, made by the Stirling Boiler Company, of Edinburgh. In these the tubes are nearly vertical, and arranged so that the hot gases are compelled to pass along different banks of tubes, and finally to emerge at the point where the feed-water enters. In this way the temperature of the gases is reduced to a minimum before entering the flue. One of the Stirling boilers is fired by coal, the supply being controlled by a Vicars' mechanical stoker, and the other is fired by gas furnished by a Duff's patent Gas-Producer, made by Messrs W. F. Mason & Co., of Manchester. Adjoining the last-mentioned boilers are two Babcock & Wilcox water-tube boilers, capable of providing steam for about 2,000 indicated horse-power. Each of the boilers is fitted with one of the same firm's superheaters, imparting from 100 deg. to 120 deg. Fahr. superheat to the steam, and also with the Babcock & Wilcox chain grate stoker actuated by eccentrics on a shaft attached to the front of the steam-drums. A Babcock & Wilcox marine type steam-boiler is also shown, this being equal to about 1,000 indicated horse-power.

It should here be remarked that the necessity for erecting a large and expensive brick chimney has been avoided by the expedient of establishing separate wrought-iron shafts for the different groups of boilers. The Lancashire boilers have a wrought-iron chimney 80 ft. high by 6 ft. internal diameter, resting upon a cast-iron bedplate built in segments upon a brick foundation; the Stirling and the Babcock boilers are each in communication with a wrought-iron shaft 80 ft. high by 4 ft. internal diameter; and the Babcock marine type boiler has a 3 ft. diameter flue connected up to the nearest chimney. All the chimneys and their bases are suitably protected by fire-brick linings. Coal is brought directly into the boiler-house by means of a siding in connexion with the system of the Caledonian Railway Company, each truck passing over an automatic weighbridge, built by Messrs. W. & T. Avery, which records the gross weight inwards and the weight of the empty truck outwards. The handling of fuel is assisted by a conveyor laid down by the New Conveyor Company, of Smethwick. In the boiler-house, and in an adjoining apartment—known as the feed-heater and pumproom—there is a very fair selection of auxiliary appliances having for their object the attainment of economy by utilising waste heat from boiler fires, and exhaust steam from the engines. Of these aids the economisers have already been mentioned, and the others are of the class of apparatus described as "feed water heaters." The well-known firm Messrs. Joseph Wright & Co., of Tipton, exhibit two of their Excelsior non-pressure heaters, which, in addition to heating the water, filter it and separate particles of oil contained therein; there are also two of the Berryman pressure type heaters. A set of Worthington vertical direct-acting pumps is devoted to the service of the heaters mentioned, the pumps having a combined duty of 35,000 lbs. of water per hour against a pressure of 160 lbs. per square inch. Two varieties of Royle's feed water heaters are to be seen in the feed-heater and pump-room; class A being intended for ordinary use, and class B for dealing with water containing a large proportion of dissolved mineral matter. Heaters of the first class are served by compound vertical duplex pumps by Messrs. Carruthers & Co., capable of delivering 35,000 lbs. of water against a pressure of 160 lbs. per square inch; the other heaters are served by a set of Weir's vertical direct-acting feed pumps. The whole of the pipe connexions are duplicated, thus reducing very materially the risk of any interruption of the water supply to the steam-boilers. This portion of the boiler department is well worthy of careful examination.

Motive power for the use of exhibitors is furnished (1) by electric current, (2) by steam engines, and (3) by compressed air. Taking these in order, we come first to the electricity generating station to be found at the south-west end of the Machinery Hall. Two of Messrs. Willans & Robinson's vertical triple-expansion central-valve engines naturally attract the attention of the visitor, the examples on view being the pair of engines designed for the new electric light station at St. Andrew's Cross, Glasgow. One motor is connected with a Crompton dynamo, and the other with a generator of the Schuckert type; in each case the armature of the dynamo takes the place of a fly-wheel, this arrangement being rendered possible by the uniformity of motion afforded by the three cranks. The power developed by each engine under normal conditions is 1,200 indicated horse-power, or 1,500 indicated horse-power in cases of emergency. An excellent coupled compound electric-traction engine is exhibited by Messrs. Davey, Paxman, & Co., of Colchester, this machine being attached to an E.C.C. dynamo by the Electric Construction Company, Limited, of Wolverhampton. Another coupled compound engine of the horizontal type is shown by Messrs. Robey & Co., of Lincoln, this engine developing 500 indicated horse-power, and acting in conjunction with a Mavor & Coulson dynamo. Two high-speed vertical compound engines and dynamos combined are also exhibited by the same firm, one of the dynamos being by Messrs. Scott & Mountain, of Newcastle. A well-designed high-speed vertical engine of the enclosed type is contributed by Messrs. Ruston, Proctor, & Co., of Lincoln, and the well-known Belliss engine is to be seen working in association with a 200 kilowatt dynamo by Messrs. Bruce Peebles & Co., Edinburgh. Other electric steam plants are included in this part of the Machinery Hall: a 125 b.h.p. vertical engine by Messrs. Sisson & Co., attached to a Clarke-Chapman dynamo; an Alley & MacLellan three-crank compound vertical engine of 300 horse-power coupled to a 6-pole dynamo; and a Browett-Lindley vertical engine of 200 horse-power, working conjointly with a generator shown by the Edison-Swan Electric Company. Altogether there are twelve sets of generators giving a total output of about 4,175 electrical horse-power, and although none of the plants can be said to be of more than the most moderate dimensions, yet they are sufficiently indicative of the fact that British engineers are alive to the importance of providing for the rapidly increasing application of electricity in the present day.

Steam is furnished to the engines by a ring main with suitable branches; stop valves are placed so that any section of the piping can be cut out in the event of mishap; and there is ample provision of separators and steam traps for removing water of condensation from the service pipes. All the separators and valves in this department have been furnished by the Glenfield Company, and the steam traps by Messrs. Royles, of Manchester. The exhaust pipes from the engines are of various diameters ranging from 5 in. to 36 in., they are arranged to furnish steam to the feed water heaters at a temperature of about 250 deg. Fahr., pressure being equalised by means of a 30-in. steam sluice valve, and they have three outlets to the atmosphere. Before dismissing the electrical plant from consideration it may be remarked that five of the dynamos afford current at from 500 to 530 volts at the terminals, and seven at from 250 to 265 volts, the range in the voltage being intended to cover losses in transmission to the different points of distribution in the Exhibition area. The main switchboard is 31 ft. 9 in. long by 7 ft. high, and contains 15 panels furnished with the usual apparatus and instruments. There are also seven distributing stations, of which two are in the Machinery Hall, one in the Grand Avenue, and three in the Industrial Hall, these stations being devoted to the control of all the arc and incandescent lighting. The arc lamp is employed in the main buildings for general lighting, ten lamps being run in series on a 500-volt system, and in the other buildings the same class of lamp is used, five in series on a 250-volt system. In addition to the above mentioned, there is a large number of incandescent lamps of various powers, including a complete system of pilot lighting, arranged so that all the principal passages can be lighted direct from the Corporation supply. All the main cables, branch main cables, and sub-main cables were supplied by the British Insulated Wire Company, of Prescot, and the arc circuit cables for the main buildings by Messrs. Frankenburg, of Salford. More than 120

motors, ranging in power from ¼ h.p. to 150 h.p., for driving machinery are to be found in the Machinery and the Industrial Halls.

One of the lines of shafting in the Machinery Hall is driven by a steam engine of 100 h.p., by Mr. John Cochrane, of Barrhead, and the other by a 100 h.p. electro motor, by Messrs. Bruce Peebles & Co., of Edinburgh. Both lines of shafting, together with all the necessary auxiliaries, were furnished by the firm of Messrs. Watson, Laidlaw, & Co., of Glasgow.

Compressed air is chiefly used for the operation of machine tools, the only exceptions we noticed being for the purpose of demonstrating the working of a locomotive engine by Messrs. Neilson, Reid, & Co., Glasgow, and of one or two full-size working models of gas meters. A very complete installation of air-compressing plant is exhibited by Messrs. Macdonald & Son, Glasgow and Newcastle, agents for the Ingersol-Sergeant Company. The same firm is responsible for a varied display both inside and outside the main buildings of the Ingersol-Sergeant and the New Taite Howard Pneumatic Tool appliances. Exhibitors requiring compressed air are supplied from the Ingersol-Sergeant plant, which includes a compound steam-driven compressor having a capacity of about 1,200 cubic feet of free air per minute, compressed to 100 lb. pressure; a steam-driven piston inlet type compressor with a capacity of 400 cubic feet per minute; and a belt-driven compressor with a capacity of 300 cubic feet per minute. Another compressor is situated in a pavilion in the Exhibition grounds, this machine being drivea by electricity, and having a capacity of 210 cubic feet per minute.

Up to the present point it has been possible to preserve to some extent a consecutive treatment of the machinery noticed, but a similar course is very difficult of application to general exhibits, partly because they are more or less distributed over the Machinery Hall and in outside pavilions, and partly for the reason that most engineering firms are manufacturers and exhibitors of different classes of apparatus. As far as practicable, however, the attempt will be made to classify our comments. Steam and electric traction come within a department of engineering which is only incidentally of interest to our professional readers, but we cannot entirely pass by without remark the admirable examples of locomotive engines occupying a prominent position in the Machinery Hall. One of the new types of passenger engines now being introduced upon the South-Eastern and Chatham Railways, is shown by Messrs. Sharp, Stewart, & Co., of Glasgow, and near this is one of the Midland standard type of passenger engine, exhibited, as before mentioned, by Messrs. Neilson, Reid, & Co. A noteworthy example of locomotive construction is an express passenger engine of the London and South-Western Railway type, shown by Messrs. Dubs & Co., of the Glasgow Locomotive Works. Electric traction, which is destined to afford much scope for the exercise of architectural skill in the vicinity of large cities, besides contributing to the well-being of the workers and dwellers therein, is well exemplified by the combined exhibit of Messrs. Dick, Kerr, & Co., the English Electric Manufacturing Company, and the Electric Railway and Tramway Carriage Works. At this stand are shown two standard types of completely equipped electric cars, a 500-kilowatt traction generator, a complete traction switchboard, and a series of traction motors and controllers. The four-wheel double-decked car is a very handsome vehicle, and the bogie combination is a single-decked vehicle of a kind not previously introduced into Great Britain, but presenting advantages which ought to commend themselves to tramway managers. The work of the three companies mentioned is specially interesting for the reason that they are making a determined effort to meet the demand for traction machinery in Great Britain with appliances of British manufacture throughout, and to compete more effectively with American and Continental engineers for colonial and foreign trade. Electric traction is also exemplified by the British Schuckert Electric Company, whose pavilion and adjoining space in the Exhibition grounds will repay a visit. We have already adverted to the generators made by this firm, whose manufactures extend to varied branches of electrical work, including dynamos, motors, transformers, switching and controlling apparatus, meters, ammeters, voltmeters, arc lamps, searchlight projectors, and electric supply stations. On the dome of the Grand Hall is a search-light projector erected by the Schuckert Company, having a parabolic mirror rather more than 78 in. in diameter. This is the largest light of the kind hitherto built; the equipment is regulated by two electric motors, and the working current is taken from the Corporation supply.

We have before referred to the principal engines used for the operation of generators, but some of the others are equally worthy of notice. Four small engines are shown by Messrs. Alexander Shanks & Co., of Arbroath. One of these is running daily, and drives a two-pole continuous current dynamo. The engine is of the vertical compound open type, giving 22 b.h.p. with steam at 100 lbs. per square inch. The second engine is also vertical, of the enclosed compound type, with forced lubrication, giving 75 b.h.p. with steam at 160 lbs. per square inch. The other two engines represent the vertical and horizontal single cylinder types made by this firm, who deserve every credit for the excellent design and finish of the machines shown. Besides the three-crank engine previously mentioned, Messrs. Alley & MacLellan exhibit two others, the smaller one of 50 b.h.p., with two pairs of cylinders disposed in the vertical tandem style. A varied collection of machinery is provided by Messrs. Clarke, Chapman, & Co., of Gateshead, amongst them being a small electric lighting set and a number of mechanical and electrical appliances, chiefly suitable for steamships. An extremely ingenious tool we noticed was a portable electric drill attached to a clamp, and driven from the motor by a flexible shaft. Messrs. Duncan Stewart & Co., of Glasgow, show an internal combustion engine of entirely novel design, in which pulverised coal is employed as fuel. Unfortunately, this interesting motor was not exhibited in working order, and the visitors had therefore no opportunity of judging for themselves as to the merits of the most recent attempt to develop the power latent in coal without the wasteful intervention of a separate furnace, water, and steam pipes. An air compressor on the same stand is driven by a vertical inverted compound engine with Meyer cut-off valves and using steam at any pressure up to 150 lbs. Headech's "Heavy Oil" motor is another engine shown by Messrs. D. Stewart & Co., specially designed for the propulsion of waggons and other vehicles used for the transportation of heavy merchandise. Ordinary paraffin oil is used as the source of power, and the engine will develop 20 b.h.p. on a consumption of one pint of paraffin per horse power per hour. An arrangement of electrically driven Weston type centrifugal machines, and an electrically driven Stewart's carbonic anhydride refrigerator are shown at the same stand.

One of the most important exhibits in the Machinery Hall is that of Messrs. Mather & Platt, of Salford. This is divided into four distinct classes, the first comprising bleaching apparatus of different kinds; the second relating to filters and the purification of sewage, to which we directed attention in a previous article, and in this class there is also a working model explanatory of the Archbutt-Deeley water-softening apparatus, which has been very successfully used for the treatment of public water supplies, and of water to be applied in various industrial operations. The third section comprises engines and electrical apparatus. Two compound open-type vertical engines may be seen, each priving a multipolar generator, the larger plant having a capacity of 135 kilowatts, and the smaller of 70 kilowatts; there is also a small high-speed engine and dynamo of unique design for an output of 200 volts, 115 amperes, equalling 23 kilowatts as normal working load. Messrs. Mather & Platt's patent high-lift centrifugal pumps are shown in two sizes; the first, capable of discharging 210 gallons per minute against a head of 70 ft., is driven by an electric motor having an output of 13 b.h.p. when running at 1,400 revolutions per minute, and the second, capable of discharging 1,250 gallons per minute against a head of 95 ft., is direct-coupled to a multipolar motor having an output of 50 b.h.p. when running at 700 revolutions per minute. Both these sets are admirable examples of design and workmanship. Another pump is of the three-throw variable stroke type, capable of delivering 2,500 gallons per hour against a pressure of 180 lbs., and the special feature of this machine is that the motor runs at a constant speed, the delivery of water being regulated entirely by varying the stroke of the plungers. By this arrangement the waste of power occurring when resistance is inserted in the main circuit for varying the speed of the motor is altogether avoided. A large generator is exhibited as an example of eight now in course of construction for the Salford Corporation tramways and lighting. This generator is of striking and massive design, weighing fully 50 tons, which is double that of any similar appliance in the Exhibition. Several electric motors from 4 b.h.p. to 46 b.h.p. are shown on the same stand, an engine-driven turbine pump of very compact design, a self-contained portable electric drill, in which the spindle is direct gear driven from the motor shaft, and an "Aspinall's" electric conveyor, which is practically an electric locomotive and crane combined. The fourth section of Messrs. Mather & Platt's exhibit is chiefly devoted to fire appliances. Of these the Grinnell automatic sprinkler is well known to our readers, and so also are some of the other appliances in the section. Messrs. Mather & Platt's armoured self-closing fire-doors are certainly constructed on common-sense principles, and deserve the success to which they have attained. Messrs. D. Bruce Peebles & Co., of Edinburgh, are a comparatively new firm, whose works are equipped, we are happy to say, with equally modern machine tools and labour-saving appliances for the manufacture of electrical apparatus. In addition to the motor and dynamo mentioned in the early part of these notes, a considerable amount of their other electrical machinery is on view. All the exhibits of this firm combine symmetrical design with good workmanship, and a visit to their stand will be by no means a waste of time. The General Electric Company and Messrs. Verity have each a good assortment of standard fittings, lamps, switches, switchboards, and kindred appliances; and the Sturtevant Engineering Company show samples of the Cutler-Hammer automatic motor starting and controlling rheostat, an appliance which is much in favour with electrical engineers.

Pumping machinery is a prominent feature of the Glasgow Exhibition, and one of the most important exhibits is that of Messrs. Tangyes. An excellent example of pumping plant for dock work is the principal object on the stand of this firm. It has been built for use at the Hebburn Graving Dock, and comprises two centrifugal pumps and two direct coupled engines, the total capacity being a delivery of three-quarters of a million cubic feet of water per hour against a head of 35 ft. Each pump is 6 ft. diameter, the suction and delivery pipes being 3 ft. 9 in. internal diameter. A smaller set of pumps intended for drainage work is worth inspection, as also is a very well made working model of the pumping engines now being built for the Hastings Corporation Waterworks. In that installation there will be two sets of pumps, including two well pumps and triple ram pumps in the engine-room, driven by two triple expansion vertical engines. The well pumps are to be capable of lifting 90,000 gallons of water per hour from a depth of about 250 ft., and of discharging this quantity through a mechanical filter working at 10 lbs. per square inch. The engine-room pumps will deliver 80,000 gallons of water per hour through rather more than 5½ miles of 16-in. main with a total rise of 515 ft. One of the Tangye gas engines is shown on the stand, but this does not call for any special remark.

An exhibit that constitutes quite a distinctive feature in the Machinery Hall is that of the well-known firm of Messrs. G. & J. Weir, of Glasgow. Something more has been attempted in this case than the mere collection of a number of utilitarian appliances. Those who are acquainted with the productions to which we refer are aware of their mechanical excellence, but every visitor to the Exhibition now has ample opportunity of appreciating the artistic taste evidenced in the arrangement of the display made by this firm. The main exhibit is situated at the level of the gallery in the Hall, and on the floor level is a concrete reservoir 40 ft. long. From this water is drawn by two Weir pumps and discharged into a lead-lined tank 8 ft. above the reservoir water level. This tank is arranged so that the water continuously flows over the front edge into the reservoir beneath, thus forming a cascade 40 ft. wide, which at night is illuminated by coloured electric lights. Many of the

pumps and other appliances exhibited, both at work and at rest, are intended for marine use, but several of them are of general interest. Amongst the latter we may cite a standard tandem compound feed pump for electric light station duty, various sizes of standard differential type pumps, and of standard boiler feed pumps. The Pulsometer Engineering Company, of London, present for examination a very excellent display of their varied manufactures. Naturally the "Pulsometer" steam pump itself occupies a prominent position, and this ingenious appliance is represented by a series ranging in capacity from the smallest, with a capacity of 900 gallons per hour, to one with a duty of 52,000 gallons in the same time. Readily set to work in almost any situation, easily shifted, and almost universal in its applications, the "Pulsometer" has fully justified its claim to recognition by engineers, architects, builders, contractors, and all who have occasion to lift water from one place to another. The horizontal "Deane" and vertical "Deane" sinking pumps are also handy and serviceable machines. A "Torrent" filter, of the so-called "mechanical" type, finds a place on the same stand, and is undoubtedly a valuable adjunct to industrial establishments of different kinds, as by its employment river or other impure water may be rendered clear and fit for use in manufacturing processes or for feeding steam boilers. Apparatus for the purification of water for use in land and marine boilers is to be seen in various stands. For instance, Messrs. Railton & Campbell exhibit their "corrugated and ringed" feed-water filters, which have been largely adopted in electric-light stations, and interesting exhibits of a similar character are made by Mr. James Davie, of Glasgow, and the Harris Patent Feed Water Filters, of Greenock, the latter firm also showing the Harris-Anderson automatic water softener. Morison's feed water heater, cleaner, and air-extractor, made by Messrs. Richardsons, Westgarth, & Co., of Hartlepool, is another appliance of interest. Zschoecke's water-cooling tower, for which Messrs. Doherty & Donat, of Manchester, are the sole licensees, includes an ingenious arrangement of patent hurdles with "dripping noses," and has been adopted in thirty-five electric light stations in different parts of the world. Messrs. John Turnbull, Jun., & Sons, of Glasgow, have a stand on which their "Hercules" turbine is shown, this machine being recognised as one of the most satisfactory water motors for electrical and other industrial purposes. Messrs. Lancaster & Tonge, of Manchester, have a good show of their specialities, including the Lancaster trap, which is probably the most reliable and satisfactory steam trap of its class. Raw-hide pinions are shown by Messrs. George Angus & Co., of Newcastle, together with specimens of leather belting. Raw-hide gearing is perfectly noiseless in action, and is therefore very suitable for employment in buildings where the working of lift or other machinery ordinarily constitutes an annoyance to the inmates. Architects as well as engineers may frequently make use of flexible steam tubing such as that exhibited by the United Flexible Metallic Tubing Company, of London. Apart from the Exhibition buildings themselves there are not many stands devoted to structural work, but the small pavilion erected in the Machinery Hall by Pease's Tubular Construction Company, of Darlington, should on no account be overlooked. The form of construction involved enables the ironwork to be put together without skilled labour, without perforations in the metal sheets. Cambered purlins bring the sheets into firm contact with tubular rafters, and the lap between the sheets is absolutely close. Pease's patent steel floor troughs are also recommended to attention. This form of flooring is very readily laid, and the hollows can be filled with concrete or ashes, or they may be automatically filled with water in the event of fire breaking out. As might be expected, Messrs. Walter Macfarlane & Co., of Glasgow, are very much in evidence, and their trophy in the Machinery Hall is worth a visit.

Messrs. P. & W. Maclellan, of Glasgow, show, in the Machinery Avenue, a full-size model of Turner's tubular fire-resisting floor; and some samples of floor troughing, as used in the Concert Hall, are exhibited by Messrs. Alexander Findlay & Co., of Motherwell. The same material was adopted, it may be remarked in passing, in the roof of the Great Central Railway Station, London. There are several fine displays of constructional iron and steel in the Machinery Hall, amongst them being those of Messrs. A. J. Stewart & Menzies, Glasgow; David Colville & Sons, Motherwell; the Steel Company of Scotland; the Glengarnock Iron and Steel Company; the British Griffin Chilled Iron and Steel Company, of Barrow; and the British Hydraulic Foundry Company. At the stand of the last-named are shown several rings of different diameters illustrative of the linings for tubular railway and other tunnels. Stone-breaking plant is represented by Messrs. Robert Broadbent & Son, of Stalybridge, whose machines are furnished with manganese steel jaws and a new draw-back motion. A fair selection of brick-making machinery is placed on view by Mr. Thomas C. Fawcett, of Leeds, but attracts comparatively little attention owing to the fact that it is not shown in operation.

We now come to appliances for elevating and conveying, foremost among which are those of the New Conveyor Company, of Birmingham, intended for industrial undertakings. The Crompton atmospheric ash-hoist may be seen at work in the boiler department of the Exhibition where it is used for lifting and discharging all the ashes from the furnaces. This hoist is noiseless in action, and although hitherto chiefly adopted in marine work, it might be advantageously applied to land boilers. Messrs. Pickerings, of Stockton-on-Tees, show examples of their well-known elevators for buildings; and Messrs. A. & P. Steven have a very complete installation of lifts at work, including hydraulic and electric elevators for passengers and goods. Messrs. Henry Pooley & Son exhibit automatic weighbridges of different kinds, as well as an assortment of scales of various descriptions. The Bundy time recorder and the Rochester time recorder, shown by the International Time Recording Company, of London, should be specially interesting to builders and contractors. Messrs. Watson, Laidlaw, & Co., of Glasgow, are makers of sugar machinery of several kinds, but they are best known in connexion with the "Weston" centrifugals and hydro-extractors, of which different types are to be seen on their stand. The water-driven type of hydro-extractor was specially designed for public institutions, and has been extensively adopted by the Glasgow Corporation in baths and other municipal buildings. Messrs. Thomas Bradford & Co., of Manchester, and Messrs. D. & J. Tullis, of Glasgow, each exhibit steam laundry machinery in considerable variety. Amongst refrigerating and ice-making plant we noticed two interesting installations in operation, by Messrs. J. and E. Hall, of Dartford, and Messrs. L. Sterne & Co., of Glasgow, representing the rival "carbonic" and "ammonia" processes.

Heating and ventilating apparatus is for the greater part contained in a separate pavilion at the end of Machinery Avenue, but there are several kindred exhibits in the Machinery Hall. Messrs. James Stott & Co., of Oldham, have examples of air propellers, ventilating appliances, and gas governors; the Sun Fan Co., of Bradford, whose specialty is ventilating and drying, show an "unbreakable" fan driven by belt, and one of the same kind direct driven by an enclosed electric motor; the James Keith and Blackman Co., of London, exhibit a Keith's python hot water boiler of exceptionally large dimensions, a 72-in. Blackman electric fan, and a large belt-driven fan; the Sturtevant Engineering Company and James Gibb & Son are also exhibitors of ventilating fans and kindred apparatus. Thwaites Brothers, of Bradford, show several types of the well-known Root's blower, of which they were the original licencees in this country. Machines of the kind are largely used in connexion with forges and foundry cupolas, and are illustrated at the Exhibition by a blower driven direct by a compound tandem engine, a belt-driven and a motor-driven blower. Other examples of the firm's work are two centrifugal pumping-engines, both of them in operation. Hot-water boilers, radiators, &c., are exhibited by several firms. Amongst those are the American Radiator Company, of London, and Messrs. Richard Crittal & Co., of London. Wood-working machinery has not received much attention at the Exhibition, although there are two fairly complete collections, one by Messrs. John McDowell & Sons, of Johnstone, and the other by Messrs. Kirchner & Co., of London. Cook's patent guards for wood-working machinery, shown by Messrs. William Cook & Sons, of Glasgow and Sheffield, are very practical and efficient appliances. The types shown are intended for circular saws, moulding machines, and planing machines. Engineer's machine tools are present in great variety—in fact, all the leading British makers, as well as most of the importers of American tools, are in evidence either in the Machinery Hall or in outside pavilions. Probably the most interesting of such exhibits are those relating to the use of compressed air for boring, drilling, chiseling, and riveting. Most of the tools adapted for these purposes are to be seen in actual operation, demonstrating very effectively the superiority of modern methods in aid of structural and other work. Several small buildings in the Machinery Avenue are devoted to acetylene apparatus, and artificial lighting is further exemplified by the high-pressure system of incandescent gas lighting. It is claimed by the exhibitors, the Water Motor and Automatic Liquid Elevator Company, of London, that by this method ten times the amount of light can be obtained from gas that would be produced in the ordinary way. Two of the company's compressors, capable of supplying 12,000 cubic feet of gas per hour are employed to furnish the pressure necessary for the high-pressure installation in the grounds of the Glasgow Exhibition. The results obtained are certainly remarkable, and there ought to be a considerable future for the system.

In closing our remarks upon machinery at the Glasgow Exhibition, we may say that although many well-known firms are noticeably absent, there is nevertheless a very fair representation of the engineering industries of the United Kingdom. Scotland is naturally well to the front so far as the number of exhibitors is concerned, whilst in point of excellence both England and Scotland show conclusively that the reputation earned by our country in the past is still being worthily maintained.

AN OLD BUILDERS' GUIDE.

MANY years before Gwilt gladdened the heart and lightened the labour of architectural students, there were efforts made by other lexicographers to bring the technical terms used by architects and builders into a consecutive list; that is to say, long before the publication of Gwilt's "Encyclopædia of Architecture," with its good glossary, a certain Richard Neve was in the field with a smaller volume wherein he set down, alphabetically, all the technical words he could include between an abacus and a zopissa, extending his explanations of some of them in an encyclopædical fashion. This work was eventually enlarged and corrected, and a third edition of it appeared in 1736. As it has become a custom among some of our contemporaries to take down old books from the shelves in their libraries and descant upon their contents, a glance at the information collected in this one may not come amiss or be considered out of the way. A plan and elevation of the Earl of Burlington's house at Chiswick were chosen for a frontispiece; and the title-page sets forth that it was "The City and Country Purchaser's and Builder's Dictionary, or the Complete Builder's Guide," and contained "an explanation of all the terms of art used by workmen, as also what is necessary to be known in the art of building, as well by gentlemen as artificers of every denomination." Further on it claims to be "very useful to gentlemen, to workmasters and workmen, in the making of bargains, contracts, or computations relating to any part of a building;" and that it was originally written and compiled by Richard Neve, Philomath. It was printed for six booksellers, who doubtless shared the risk of the venture. The first edition must have met with a good sale, for before the third was undertaken two rival volumes made their appearance that had incorporated a great part of Mr. Neve's observations and experiences, to the great indignation of the six booksellers mentioned, whose names were Sprint, Brown, Osborn, Birt, Linton, and Wilde, some of which are familiar to us through other associations.

Mr. Richard Neve refers to a previous author, Mr. Sebastian Le Clerc, as an authority for the range of subjects necessary for any one to study to "procure him a genius, an accuracy and a good taste," as well as to the authors of older times, such as Pliny, Vitruvius, and Palladio. He mentions several persons then living by name, who gave him their experi-

ence as to prices and methods, either in their works or in correspondence or conversation, and thus we learn something of the identity of individuals who have now long passed away, and into whose labours we may be said to have entered. For instance, he mentions the ingenious surveyor, Mr. R. Hooke, who caused water to be thrown over each course of brickwork in the building of the College of Physicians in Warwick-lane. A Mr. Wing gave him the current prices of materials in Rutlandshire, which differed very much from those furnished him by Mr. Leybourne, of London. A Mr. Switzer was his authority for Wiltshire facts. He mentions a method of surveying practised by Mr. Ventres Mandays, and experiments by Dr. Halley (levelling by means of the barometer) and Dr. Derham. Mr. Miller, of Chelsea, the author of a gardeners' dictionary, is often quoted for his opinion concerning trees and timber. If there should be any descendants of these worthies at the present day, they may be glad to hear of the consideration in which they were held. It was only thirteen years before that Sir Christopher Wren was buried in St. Paul's Cathedral, with the proud word *circumspice* on his tombstone in the crypt. It was just about the time that Johnson and Garrick resolved to try their fortunes in London, and twenty years before the publication of Johnson's own dictionary. Pope and Swift were still living, and Horace Walpole had not then begun his Parliamentary career, nor inaugurated the revival of Gothic architecture at Strawberry Hill. An Act of Parliament had been passed not very long before that required all water from the tops of houses, balconies, and pent-houses to be conveyed by "party pipes" into channels under a penalty of 10*l.* for non-compliance.

As we turn over the pages, to which time has given an incomparable tint, we come to many quaint expressions. For example, in one place our author tells us that light is God's eldest daughter, and in another that it is better to be too little for a day (in planning a house) than too big for a year, and easier to borrow a brace of chambers of your neighbours for a night than a bag of money for a twelvemonth. He tells us that a weather-cock was often called a beggar-man in those days, and writes of the sky as the cope of Heaven. In building he says:—"Let not the front of your house look asquint on a stranger, but accost him right at the entrance." And concerning timber and trees, he says it is worth every builder's while to get Spenser's lines about trees to heart, and gives them in full. A gnomon was called a cock o' the dial.

It is, however, to more practical items in his experience that we would call attention. He tells us that one Rubble, a mason in Rootham, in Kent, had offered to teach a thatcher, for a small matter, how to thatch a roof so that no mouse or rat could get into it, but that the thatcher, thinking the secret would be of no use to him, declined to purchase it. The Rootham mason assured him he knew a thatcher who had 4d. a square yard more than the usual price for doing it in this particular manner. But still the thatcher declined the offer. "This," says Neve, simply, "is a thing worth inquiring after." Wages, of course, were on a different scale from those of the present day. He makes out various bills for the instruction of his readers, and from these we glean that a bricklayer and his labourer would lay about a thousand bricks in a day, but if very efficient as many as twelve or thirteen hundred. For a day's work for himself, or the master, he puts down 3s., for the man 2s. 6d., and for the labourer 1s. 8d. The price of the bricks differed, too. Mr. Wing reported they were only 12s. per thousand at the kiln in Rutlandshire; and Mr. Leybourne never knew them to be cheaper than 9s. nor dearer than 18s. in London. In Sussex and Kent Mr. Neve knew them to be sold for 16s. a thousand, though at some places, where they lay them two or three miles distant, they were 20s. The price of making the bricks is thus told:—"In the country their usual price is 6d. per thousand for the moulder, the bearer-off hath 4d., and he that tempers the earth ready for use hath 4d. per thousand, and he that digs it hath 6d. per thousand. For making the earth ready (after it is digged, the digging not being reckoned into the making), moulding, bearing-off, &c., and burning, their usual price is 5s. per thousand." In the city there was a division of work into tiling, walling, chimney-work, and paving; but in the country a bricklayer was generally a mason and a plasterer, too. Materials in some items are altogether changed from those in use in 1736. Wooden pipes for the conveyance of water were then the alternative of the expense of leaden ones. The best kind were made of oak and cost 20s. a yard, or half the price of lead; but, says Mr. Neve, "iron pipes are now growing into vogue." Pipes made of alder were the cheapest of all; they were bored for about 10d. or 12d. per yard, but being necessarily small, were not strong enough to bear much force, and were consequently only available for gentle streams or small springs and short distances. The pump-makers about London, he says, made use of fir for pipes; but elm was stronger, and it might be cut down, hewed, or bored from 8d. to 20d. a yard, "5d. or 6d. a yard boring being a sufficient allowance." He also mentions square pipes made of elm plank as resulting in less waste in cutting. He says nothing about the divining-rod as a means of discovering water, but recommends the following proceeding in searching for springs:—"If you lie down on the ground, in places where you would seek for them, before the sun rises, and having placed your chin as close as you can, till it is, as it were, propped by the earth, so that the adjacent country may be plainly seen (the reason of this posture is, that by this position the light will not wander any higher than it ought): If you keep your chin unmoved, it will give a certain definition, and true level of the parts where you are plac'd, and in those places where you see vapours gathering themselves together and rising up into the air, there you may dig; for this sign never happens in a dry place." Further on he remarks that there is not a more certain sign of water in the world than when the alder tree grows naturally in a place. But we pause to consider the water-seeker of those days taking off his three-cornered hat, and smart with his ruffles, buckles, wig or queue, getting himself into the position indicated above.

Our author relates there was an attempt to introduce saw-mills driven by wind and water, as in Holland and other places abroad, but Parliament interposed for the sake of the families that would have been impoverished by the loss of the hand labour. "By this means," says our author, "an useful improvement is not only lost to the kingdom, but foreigners are thereby enabled to underwork and undersell us in all sorts of building materials that require the saw. Much better would it have been, as we humbly presume to think, if the Parliament, at the expense of the publick, provided for the poor families some other way that would have yielded them equivalent maintenance for life, and suffer'd the public to reap the advantage of the improvement; and every builder might have been tax'd what he would have sav'd by the mill-sawing, towards their provision. And as no more than a small limited number should have been brought up to the business for the future, this charge would have soon been over." The price of sawing up oak varied from 2s. 8d. to 3s. 6d. per 100 superficial feet. The sawing of ash and beech was rather more, in some places touching 4s. per 100 ft. An experienced sawyer told him they sometimes cut ship-planks for 10s. the load. The lowest rate in Sussex was 6s. the load, but as they built at Tunbridge Wells it was 7s. 6d. or 8s.

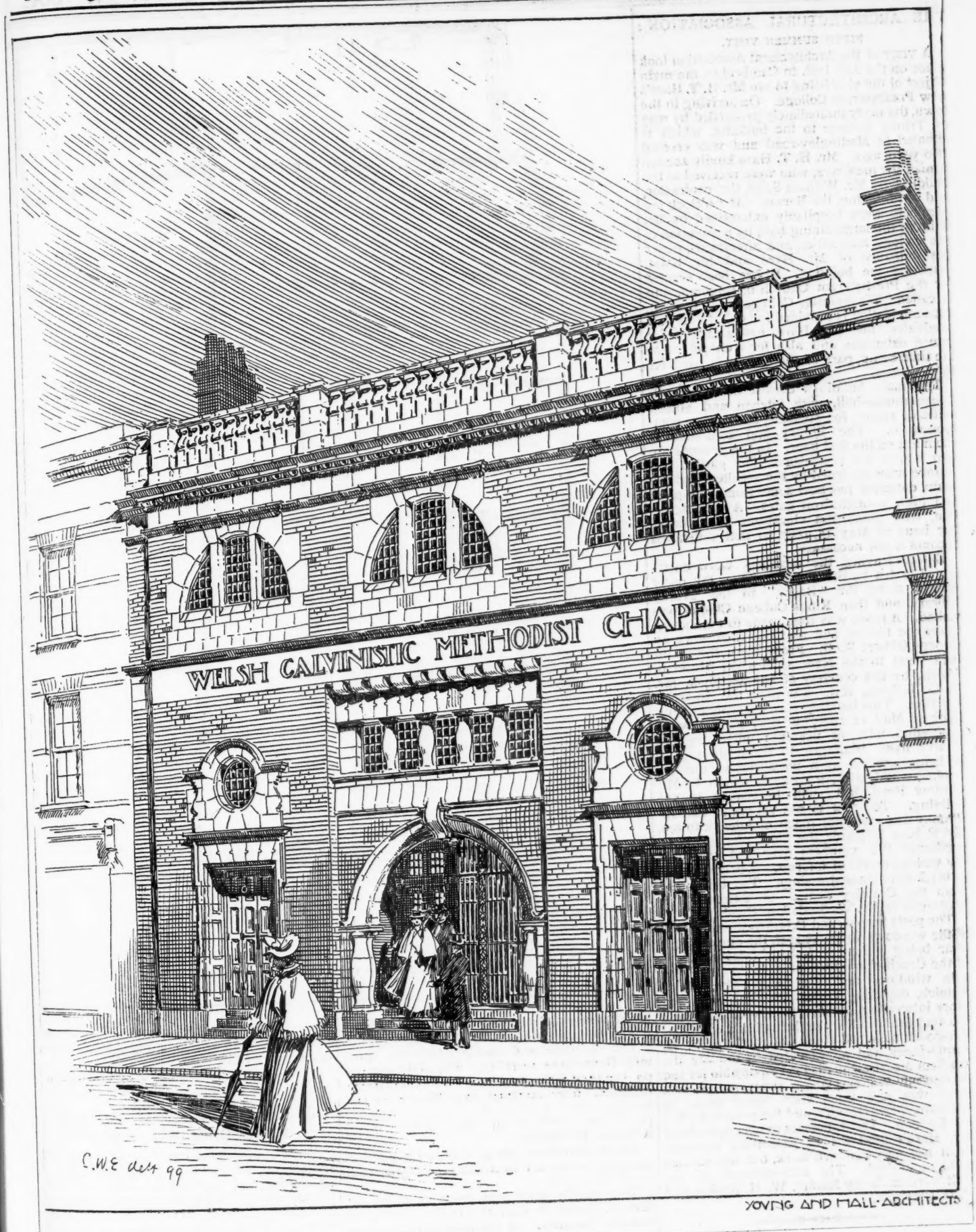
Of glass, our author describes ten kinds: Crown, made at Ratcliff and Lambeth; French; German, two sorts, white and green; Dutch; Newcastle; Staffordshire; Bristol, looking-glass; Jealous, or wrinkled, so that one cannot distinctly see what is done on the other side of it; and Woolwich glass. The Ratcliff Crown glass was 9d. per ft., and when wrought in lead and set up 1s. 6d. The Lambeth variety was 8d. in squares and 1s. 4d. when wrought and set up in windows. Mr. Leybourne gave his experience that the price of Newcastle glass was uncertain, because when coal was plentiful it was cheap, and when coal was scarce it became dearer. A London glazier, however, stated that the most common price of it was 34s. per case. Woolwich glass, by reason of some discouragement, ceased to be made.

The prevalence of diamond panes is indicated in the association of lead with the glass in many of the computations given. "For taking down quarry-glass and soddering it anew, and banding and setting up again, the usual price is 1½d. per foot; but if it be in churches where they say they have usually more banding, &c., their price is 2d. per foot. They have also 2d. per foot for taking down, scouring, soddering, banding, and setting up again the old-fashion'd work, which is composed of pieces of glass of different sizes and figures."

Some of the definitions in their simplicity remind us of that famous chapter on snakes in Ireland. The word dial, for instance, is said to represent what is so well known as to need no description. Some, again, tell of considerable confusion. Thus, a confessional is described as "a place in churches, under the main altar, where anciently the bones of deceased martyrs and confessors were deposited;" and a steeple is said to be "a well-known pile built at the west end of a church to hold the bells, &c." It is called a spire when it ends in a sharp point, and a tower when otherwise. But there is a prescience of possibilities here and there that have since come to pass. Neve had a thought, he tells us, that something might be done in the way of making mantel-pieces, mouldings, and architraves, door and window frames of similar materials out of which bricks were made. "If men of this profession," he goes on, "would set their minds to contrive some good composition of earth, and a way to manage it well in moulding, burning, &c. But, the more is the pity, men of this profession too generally partake of the materials they work upon." Probably, if he saw the use now made of terra-cotta he would be less disdainful of the characteristics of brick-burners. A touch, too, here and there, tells of innovations then making their way. More than once he refers to the new custom of placing closets in rooms. Painted wainscot he speaks of as now so much used. He dwells, too, on the importance of a healthy situation for a house, quoting Dr. Fuller, a prebend of Sarum, who put it forcibly that air being a dish one feeds on every minute, it had need be salubrious. We may gather that cisterns were considered to be well-placed in cellars; and that for a basin or reservoir the clay should be first well wrought with the hands and then trodden in with the naked feet. In connexion with the ornamental rose, he tells of that custom among the ancients of placing a rose on the ceiling of rooms where they met for companionship, to intimate that all restraint might be laid aside with the certainty that nothing said there would be repeated elsewhere, and remarks, somewhat cynically, "we all know people who ought to meet under the influence of the symbol."

There is but little difference observable in the spelling of most of the words used in technicalities. The skreen is now the screen, of course, just as the spaw is now the spa. Stuck has lengthened out to stucco nowadays. Speaking of statues, Neve says:—"Several statues are made in stuck. These figures are for the ornament of ceilings, friezes, and cornices. As to the making of figures, the first thing is to form the soul of plaster," and when this psychological feat is performed, then the soul is covered with stuck, for which the workman had proper tools. A contemporary tone may be noticed in the mention of the ingenious Mr. Allen (people were often ingenious in those days), who lived in Bath, and owned the quarries there. Neve says he was justly esteemed an honour to the Bath, but he should say the less of him and his quarries because they are so well known to the politest part of the kingdom, "who have now two inducements for going to Bath; the first, the wonderful and salutiferous waters that have justly renowned that place for so many ages; and the other, the surprising effects of this gentleman's extraordinary genius which appear in the works and inventions we have mentioned (for lifting and conveying stone), and others that are still every year rising under his direction, to engage the admiration of the curious."

And as we close the embrowned volume to put it back in its place, and give a glance to its still glossy chestnut-hued cover, we think of the beaux and belles of Bath before Miss Austen set them down in black and white, or Beau Brummel ordered the rules and regulations of the assemblies; and still more of the thatchers, bricklayers, and ill-paid brick-makers, masons, plasterers, smiths, carpenters, glaziers, slaters (Neve makes no mention of Welsh slates, though he notices a difference recorded by the barometer between the top and base of Snowdon, and says slates were



chiefly used for summer-houses and banqueting-houses in gardens as being light and lasting), tilers (he calls them "tylers"), who helped to make up the more workaday world so long ago; and most of all, perhaps, of the self-styled Philomath, the lexicographical Neve, and his friends Wing, Leybourne, Switzer, and Miller. The last-named, by-the-bye, is still quoted in the fashionable books on gardening of the present day. Linnæus styled him the Prince of Gardeners. The Chelsea Gardens were in his care from 1722 to 1771. S. W.

MESSRS. DOULTON & CO., LIMITED.—The King has granted permission to Messrs. Doulton & Co., Limited, to use the title "Royal" in describing their potteries and manufactures.

WELSH CALVINISTIC METHODIST CHAPEL.

THIS chapel was erected last year for the congregation of Welsh Methodists at Mile End. The front towards the Mile End-road occupies the site of three old houses. The central opening gives access to the ground floor of the chapel; the two side openings to staircases leading to the galleries. The chapel itself is lit by a large octagonal lantern light in the roof. It provides accommodation for about 400 people. At the back is a large vestry, with lavatories, &c., and a large yard at present unbuilt upon, but on which it is proposed at some time to erect schoolrooms and classrooms. The contractors for the building work generally were Messrs. Falkner & Sons, Ossory-road, Old Kent-road, S.E.; the terra cotta was supplied by the Burmantofts Company; the steel work was carried out by Messrs. Fawcett & Co.; and the heating apparatus was provided by Messrs. Haden & Sons. The work was carried out from the plans and under the superintendence of the architects, Messrs. Young & Hall, Southampton-street, Bloomsbury, W.C.

APPOINTMENT.—Mr. Reginald Brown has been appointed Surveyor and Engineer to the Southall-Norwood Urban District Council. He was selected from over 100 applicants. Mr. Brown was for two and a half years Chief Surveyor, Stoke Newington; six years chief Assistant-Surveyor, Ealing; and about two years Assistant-Surveyor, Brentford.

THE ARCHITECTURAL ASSOCIATION :

FIFTH SUMMER VISIT.

A VISIT of the Architectural Association took place on the 24th inst. to Cambridge, the main object of the visit being to see Mr. H. T. Hare's new Presbyterian College. On arriving in the town, the party immediately proceeded by way of Trinity College to the building, which is situated in Madingley-road and was erected two years ago. Mr. H. T. Hare kindly accompanied the members, who were received at the building by Mr. William Saint, the contractor, and Mr. Smieton, the Bursar. At 1 o'clock the members were hospitably entertained by Mr. Saint in the large dining hall, by permission of the college authorities, and afterwards, under the guidance of Mr. Hare and Mr. Saint, inspected the building. It has been erected for the Presbyterian Church of England, and is called "Westminster College." At present, accommodation is provided for only twenty-six graduates, but Mr. Hare has arranged for future extension and also for a chapel. For the time being, part of the library is used for this purpose.

The main buildings consist of Principal's house, dining-hall, with kitchen and offices, suites of rooms for students, and a large common-room. The library and combination-room are on the first floor. In the grounds are two houses for professors. The garden and terrace were designed by the architect and the main entrance has now some stone gate-piers and high wrought-iron gates. A full description, with plans and elevations, appeared in our issue of May 15, 1897, so that a detailed account is not necessary.

Before leaving, the members were entertained to tea by the Bursar. Then the party walked along the "Backs" to the Trinity Library, and then Kings College Chapel was visited. A move was then made to Pembroke, to see the library, and also the new work by George Gilbert Scott. From there the members went to the New Geological Museum, which, by the courtesy of the architect, Mr. T. G. Jackson, R.A., was open for their inspection. This building was illustrated in our issue of May 12, 1900, but only part is being proceeded with at present; when finished it will have frontages to three streets. It is being erected as a memorial to the late Professor Sidgwick, a statue of whom, by Mr. Onslow Ford, R.A., will be placed in the building. The roof is not yet on, so that internally there was not much of interest to see. Mr. Robert Edwards, the clerk of the works, conducted the members over and explained the various points of interest. Externally, it is of brick with stone dressings. The bricks are from the Crawley district of Sussex. The contractor is Mr. W. Sindall, of Cambridge.

The party then visited Peterhouse and looked at the windows in the chapel, the one over the altar being a copy of Rubens' famous picture of the Crucifixion which is at Antwerp. The side windows are filled with glass from Munich, depicting various Biblical incidents. More interesting, perhaps, to the members were the very fine windows in the hall and combination-room, some of them designed by Sir E. Burne-Jones, and all executed by the late Mr. William Morris, who also is responsible for the decoration and carpets in these rooms. As there was still time, visits were made to Emmanuel and Queen's, and the party then left for London. The members much appreciated Mr. Hare's kindness in personally showing them not only his own work, but the various colleges visited. The arrangements of the visit were made by Messrs. W. H. Raffles and F. D. Clapham.

Illustrations.

LLOYDS REGISTRY OF SHIPPING.

THIS building has been erected for Lloyds Register of British and Foreign Shipping. It is situated in, and forms a feature of, Fenchurch-street, and the new street named Lloyds-avenue.

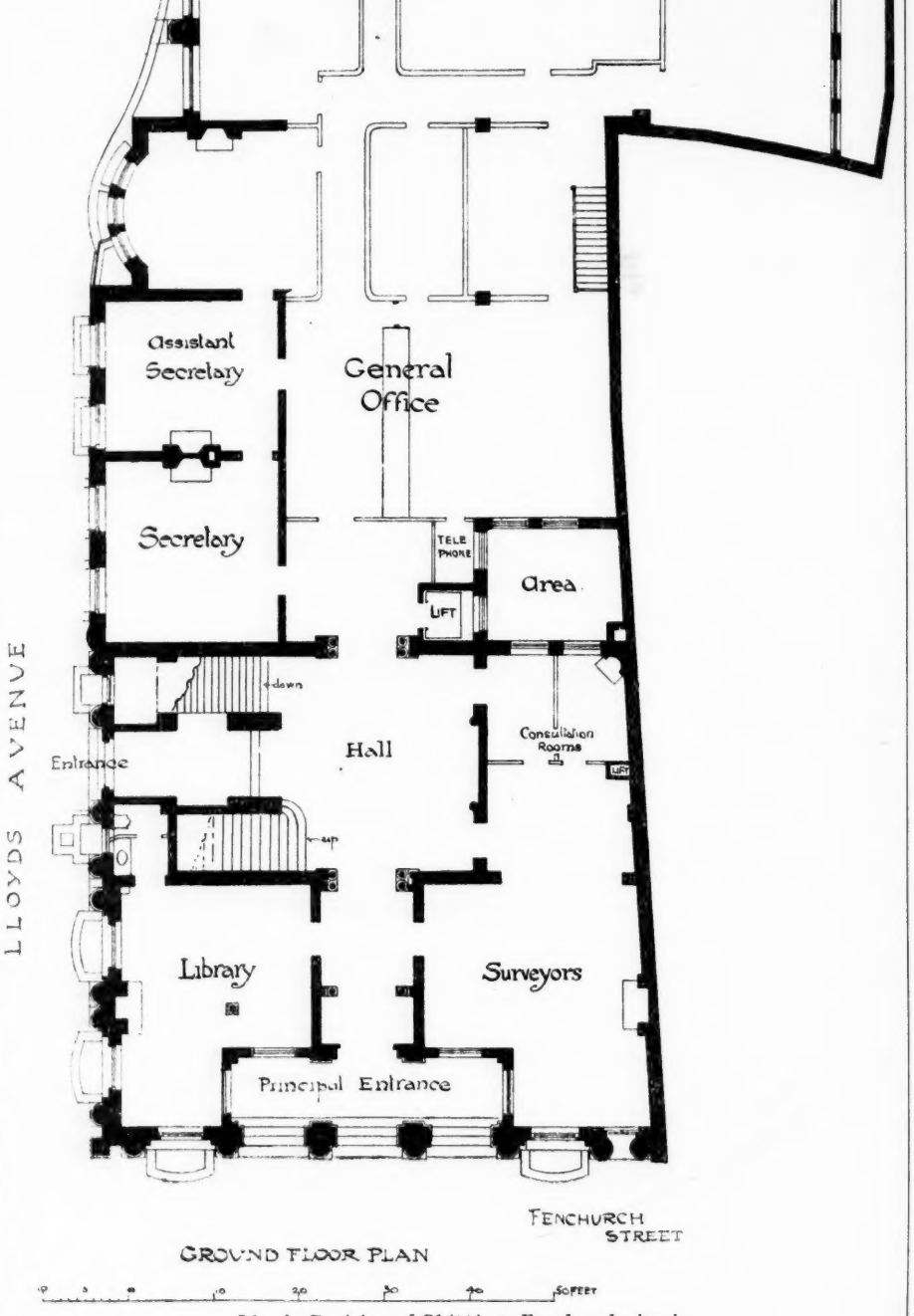
The whole of the two elevations is faced with Portland stone, the sculptured work being from the designs of Mr. G. Frampton, A.R.A., and the ornamental carving by Mr. J. E. Taylerson.

The boardroom is 47 ft. by 28 ft., and has an elliptical ceiling carried by marble columns, between which is inlaid mahogany panelling. The ceiling is being decorated by Mr. Gerald Moira; over the principal fireplace is a large marble sculptured panel by Mr. H. A. Pegram.

The staircase and entrance-hall are lined with Devonshire marbles. The staircase has on the first floor a bronze and ivory frieze, designed and executed by Mr. F. Lynn Jenkins—one panel of this frieze occupied a prominent position in this year's Royal Academy Exhibition.

The Committee-room is panelled in English oak, and the library in African mahogany with inlaid ornament.

The marble work has been executed by Messrs. Burke & Co. and Messrs. Jenkins & Sons, of Torquay, and the ornamental plastering by Messrs. Jackson & Sons. The general contractors for the building were Messrs. John Mowlem & Co., and the whole has been carried out from the designs and under the superintendence of the architect, Mr. T. E. Collcutt.



Lloyds Registry of Shipping, Fenchurch-street.

"THE ENGLISH RENAISSANCE."

THE illustrations of Houghton, Norfolk; mural fountain, Bowood, Wilts; and details of Great Hall, Winchester School, are from Messrs. Belcher & Macartney's "Later English Renaissance" and are referred to in a review of that work on another page.

CUPOLA, QUEEN'S COLLEGE, OXFORD, AND OLD HOUSE, LUDLOW.

THE cupola to Queen's College, Oxford, is the central one to the outer quad, while the old house, Ludlow, is a typical example of woodwork in that part of the country.

EDWIN FORBES.

BRISTOL AND GLOUCESTERSHIRE ARCHÆOLOGICAL SOCIETY.

HAVING in their summer meeting last year visited the southern part of the county of Gloucester, and made an incursion into Wilts, the members of the Bristol and Gloucestershire Archæological Society made their headquarters this year in the eastern portion of their own county, and in their excursions took in a district of Worcestershire. The Bristol contingent and those from the upper part of the county united at Ashchurch on the 20th inst., and were then conveyed to that most interesting town, Evesham. The name is derived from Evees ham, "the dwelling on the level by a river's side," but traditionally from Eeves, a swineherd, whose marvellous narration led to the foundation of the abbey in 701. He saw, so he related to Ecgwyn, Bishop of Worcester, the vision of a lady, whose glory darkened the sun, and her beauty above that of women, with two female attendants. The bishop went in search of the apparition and found the lady in a wood, decked with a cross of gold and in robes whiter than the lily and more fragrant than the rose. King Ethelred, when he heard of the vision, gave a site, Ecgwyn built St. Mary's Minster, and became the first abbot. At the

battle of Evesham in 1265 the abbey was desecrated by the massacre of the fugitives who fled for refuge to it. The tourist of to-day is enabled to see a singularly beautiful gate tower and two churches standing in the same cemetery, and rising from a gentle elevation sloping to the meadows which skirt the banks of the Avon. The churches of St. Lawrance and All Saints were both erected by the inmates of the abbey for the inhabitants of the town. As to the Benedictine mitred abbey of St. Mary the Virgin, the church stood immediately south of All Saints and south-east of St. Lawrance, so that the north-west angle of the nave of the abbey church was in a line with the south-east angle of the south aisle of St. Lawrance Church. Numerous fragments, richly carved and gilt, have been found on the site.

The party first entered the church of All Saints, being received by the Rev. J. H. Walker, the vicar. Mr. H. A. Prothero described some of the features of the church. Of the two churches All Saints' is the larger and more architecturally varied. It consists of a west porch, west tower, nave, aisles, transepts, Lichfield chapel, chancel, and vestries. Outside, the most unusual feature is the very rich sixteenth century west porch, with entrances north and south, a fine moulded west window, and very high open parapet. The church, about 130 ft. long by 73 ft. at its widest part, has an early arch opening into it from the porch, on the north side of which is a stoup. The nave of four wide bays is divided from the aisles by a continuous arcade to the south, and three arches with a break and a transeptal arch on the north; above which is a low clearstory with quatrefoil windows, and the whole is covered by a tie-beam roof. The great feature of the interior is Abbot Lichfield's Chantry Chapel of Our Lady of St. Ecgwyn. The very gorgeous roof of fan tracery is worked in two circles, two semi-circles, and four quarter-circles. The pendant, a very rich one, is in an unusual place at the side against the wall. A design of roses surrounds the shield and monogram of Clement Lichfield. The old altar and reredos have disappeared, also the old glass; otherwise the chapel is uninjured. In the church are hung up lists of the abbots from St. Ecgwyn to Lichfield and his nominal successor, also of the vicars of the two parishes from 1535 to 1647, and of the united parish from 1662 to the present time.

St. Lawrance Church, though showing some traces of earlier work, is, in the main, a simple sixteenth century church, built straight off as one now sees it. Its history appears to be that it was entirely rebuilt by Abbot Lichfield, and perhaps barely finished when the abbey was seized.

When the party had spent an hour in Evesham they entered their vehicles and were driven to Wickhamford, where they were received at the church by the Rev. W. H. Price, having passed the Grange, a fine half-timbered mansion restored by Lord Sandys. The church of Wickhamford consists of a nave, chancel, and western tower. The "three-decker," the screen, the western gallery (the front of which remains), the seats, and the royal escutcheon are all of seventeenth century date. The carvings of the Virgin and Holy Child on the pulpit are very unusual and very interesting, considering the date. An inscription says that the church was restored and beautified by Lord Sandys, of Ombersley Court, in 1841, and it is stated that the pews and gallery were brought from a church in London by Lord Sandys. On the north side of the chancel is a double alabaster monument, supported by five pillars and two pilasters, on the two slabs of which lie respectively the effigies of Sir Edmund and Lady Sandys and Edwin Sandys and his wife, Penelope. On the front of the tomb are the kneeling figures of the sons and daughters, and above are the figures of Faith, Hope, Charity, and Time, and various coats of arms on shields or lozenges. On the north side of the sanctuary is a flat stone to the memory of Penelope Washington, bearing the family arms, supposed to be the original of the stars and stripes on the flag of the United States.

Chipping Campden was the next place in the route. The town derived its first name from *Ceapan*, to buy, and, like Chipping Sodbury and Chipping Norton, was a market town of some importance, and a trading centre for Cotteswold and Welsh wool. It had a charter from Henry III. and James I., and grants of fairs, &c., from the early lords of the manor. The Corporation was abolished in 1883. Baptist Hicks built Campden House at Kensington in 1612, and commenced the construction of a splendid mansion at Campden in the following year. In 1620 he was created Lord Hicks of Ilmington, and in 1628 Viscount Campden. He died in 1629, and was succeeded as lord of the manor and Viscount Campden by his son-in-law, Sir Edward Noel, who died at Oxford in 1642. During the Civil War, Campden House was occupied in turn by the Puritans and Royalists, and in 1645 it was destroyed by Sir Henry Bard, who had held it for the King.

There was a meeting at the Town Hall, and the Rev. T. Carrington, the vicar, was voted into the chair. He said he hoped the Society would have pleasant memories of their quaint old town, and vacated the chair in favour of Alderman Fox. The annual report was read by the Rev. Canon Bazeley, and stated that there were at present 385 annual members, eighty-two life members, and three honorary members on the Society's list, giving a total of 470 members, as against 409 in July, 1900. The income of the Society for the year ending December, 1900, including a balance of 416*l.* 11s. 3½d., was 664*l.* 12s. 6½d., and the expenditure for the same period was 238*l.* 4s. 9d., leaving a balance at the Society's bankers of 426*l.* 7s. 9½d. on December 31, 1900. From that balance, however, should be deducted the cost of the Society's "Transactions" for 1900, the first part of which had been issued to the members, and the second part would be in their hands in October. Volume xxiv., part I., for 1901, would, it was hoped, be issued before the end of the year. Besides the balance of 426*l.* 7s. 9½d. the Society had a funded capital of 632*l.* 3s. 10d. The investigations which were commenced on the site of the Cistercian Abbey of St. Mary Hayles in 1899 were continued in 1900, and the abbey church was carefully excavated under the superintendence of Mr. St. Clair Baddeley and the general secretary. The excavation had been temporarily suspended owing to the sale of the Toddington estate, but it was hoped that they would be recommenced next year. The Council had gladly adopted the suggestion of the Congress of Archæological Societies that a list of the monumental effigies in Bristol and Gloucestershire should be compiled under the direction of that Society. The Committee nominated the re-election of the President of the Council, the Vice-Presidents, and the other officers.

Mr. T. Sherwood Smith moved the re-election of the following gentlemen as members of the council, viz., the Rev. J. M. Hall, Canon Ellacombe, Mr. G. S. Blakeway, Mr. H. Medland, and Mr. C. H. Dancey.

Mr. Scears seconded the resolution, which was adopted.

On the motion of Bishop Brownlow, thanks were tendered to Alderman Fox for his services as President during the past year.

Alderman Fox, in acknowledging the compliment, expressed the great aid he had received from Canon Bazeley. He then said that he desired to introduce to them his successor, the Earl of Gainsborough.

The Earl of Gainsborough then presided. He adverted to the changes which had taken place in the town, and spoke of it as a centre to which wool was brought from the Cotswolds. He was afraid places of that size in agricultural districts had not any chance of getting beyond their present prosperity.

The Vicar received the party at the church and gave some information as to the building. The Church of Campden is said to be dedicated to St. James. It would seem that this, or an earlier church, was dedicated to St. Mary the Virgin. It consists of a nave with north and south aisles which are continued eastwards, and a clearstory, a western tower, and a chancel with north chapel, now used as a vestry. Below the north side is a crypt. The nave has five bays on either side with lofty columns. The south chapel of the chancel has been used as a burial-place of the Hicks and Noel families, and contains four life-sized effigies and two busts. The chancel roof is said to have been the gift of Sir Baptist Hicks, who also was the donor of the Jacobean pulpit and the brass eagle. It was he who built Campden House at the beginning of the seventeenth century, and probably must be assigned to him the rebuilding of the porch, the caps of the turret staircases leading to the roofs at the north-west and south-west corners of the nave, and perhaps also the battlements and pinnacles of the nave. There is a quaintly-carved niche over the fifteenth-century doorway of the porch, which must be an insertion. In the middle of the south chapel on an altar tomb recline the superb alabaster effigies of Sir Baptist Hicks, Viscount Campden and his wife, Elizabeth, arrayed in mantles, ruffs and coronets. He died in 1629, and his widow erected this monument to his memory. On the south side of the chapel are the marble effigies of Sir Edward Noel, Viscount Campden, and Julianna, his wife, one of the daughters and co-heiresses of Sir Baptist Hicks. They died respectively in 1642 and 1644. They are represented as standing in a cupboard or tomb, enveloped in shrouds.

Old Campden House, adjoining the church, was also visited by the archæologists. At night a conversazione was held at the Town Hall, and papers were read.

On the 21st inst. the members proceeded in carriages to Ebrington. The village of Ebrington, with its quaint houses, was seen to signal advantage, and the party lost no time in inspecting the picturesque features which presented themselves. The Rev. W. Barclay read particulars respecting the church. It is stated that the name Ebrington is derived from the patron saint, St. Eadburgha. The place appears to have been the scene of a battle, as in a field not far from the vicarage, human skeletons, shields, and spear-heads of Saxon manufacture have been found. The church consists of a nave with south chapel, chancel, and western tower. The north wall of the nave has been rebuilt. The south window of the chancel and the east window of the south chapel contain some painted glass, given by Sir William Keyt, representing the life of Joseph, also the arms of Keyt, of Coventry, &c. On the north side of the altar the effigy of Sir John Fortescue Lord Chancellor in the time of Henry VI., lies on a handsome fifteenth century tomb, with a tablet erected to his memory by Robert Fortescue in 1677, and repaired in 1765 by Matthew, Lord Fortescue. On the south wall are the busts of Sir John Keyt, who died in 1662, and his wife Margaret, daughter and heir of William Taylor, of Brixworth, who died in 1669. The chancel arch is Perpendicular. Two pointed arches lead into the south chapel, which has an open timber roof. The doorway of the rood loft remains. The Late Perpendicular tower of two stages is embattled; it has four pinnacles, and a staircase in the south-east angle.

Hidcote House, about two miles from Campden, was the next halting place, permission to examine the mansion being readily extended by Major Wright. When his auditors were assembled on the green sward in front of the house, Canon Bazeley read some notes on the structure by Mr. E. Guy Dawber. The writer said Hidcote House stood on high ground and was a picturesque example of the seventeenth century architecture. It was built entirely of stone in the not uncommon "L" shape. The plan was entirely self-contained, there being no porch or bay window, or other projection. The house was dated 1663. The interior, as well as the exterior, was examined by the party, though much of the inside fittings is modern.

After leaving Hidcote the party were conveyed to Quinton, where the Rev. W. Bazeley gave some particulars in regard to the church. Quinton, which appears in the Domesday Survey as Quenintune, in the hundred of Ceolflede, was held in 1086 by Hugh de Grentmaisnil, of Lisieux in Normandy, one of the companions of the Conqueror. Hugh died in 1093, leaving a son, Robert. In the reign of Stephen, Robert Marmion, Lord of Tamworth, in Warwickshire, gave the church of Quinton to the nuns of Polesworth, and they held it till their convent was dissolved. The arches of the south arcade have capitals with scalloped edges and truncated cone mouldings, and short round piers cut square on the south side, but hollowed out with a square set off on the north side. This arcade is no doubt part of the original Norman church. The north arcade, with its pointed arches and small circular moulded caps, is Transitional Norman, and was probably added after the nuns of Polesworth obtained the church. The chancel is Early English, with characteristic moulding below the windows continued along the east wall. There are two deeply-splayed hooded windows, and one beautiful fifteenth century window on the north side. The windows on the south side are of the fourteenth-century

style. The east window was walled up until the recent restoration. There is an Early English aumbry on the north side of the altar, and a bracket for a piscina of the same style on the south side. The tower has a single light window. The belfry windows are long, each of them having two lights and a transom. The parapet is embattled, and at each angle there is a crocketed pinnacle. The late fifteenth century ribbed spire has some ogee-headed windows, and near the top a band of Tudor flowers. The aisles and clear-story have no battlements. The east gable of the nave has a bell niche. The effigy of Sir William Clopton lies on an altar tomb under the south arcade. The brass effigy of Joan, Lady Clopton, lies on an altar tomb in the Radbrook Chapel. The figure is within an arched canopy.

The party then proceeded to Mickleton, and having inspected the church, they repaired to Long Marston, and then left for Chipping Campden via Burnt Norton.

At the conversazione held in the Town Hall there was a good attendance, and papers were read. The Earl of Gainsborough presided. A paper had been prepared by Mr. E. Guy Dawber on the "Domestic Architecture of Campden," but as he was unable to be present Canon Bazeley read it. The writer stated that Campden was almost unique amongst the many interesting towns of the Cotswolds, and within its small limits contained some beautiful examples of domestic architecture. It lay in the heart of the stone district, that material being used to the exclusion, almost, of all others, and they found there the genuine Cotswold common-sense stone building brought almost to perfection. Apart from the picturesqueness of the long street with the somewhat unusual arrangement of groups of isolated buildings, and the strong and sturdy character of its architecture, it was singular in presenting a group of buildings, designed evidently by one hand and erected within a few years of each other. Thus possessing all the charm and variety of the local work, they were stamped with a scholarly feeling and grasp of design and composition that imparted an air of distinction, apart from the other buildings of the town.

Mr. F. B. Osborne read a paper on the local grammar school, and Mr. Kennedy Skipton read a paper on "Sports in Gloucestershire."

Mr. W. St. Clair Baddeley referred to the monuments at Miserden Church to Sir William and Lady Sandys. He said the sculptor was an Englishman, Nicholas Stone, and the work was not Italian, as often stated.

On the 22nd inst. the members entered upon the final day of their gathering. A concluding meeting was held at the Town Hall, when a vote of thanks was accorded to the Earl of Gainsborough as President, on the motion of Mr. C. Bowly, seconded by Mr. J. Baker, and a vote of thanks was passed to Canon Bazeley, the General Secretary.

The first stopping place after the vehicles had been entered was Buckland, and to reach it the party journeyed past Campden House and the tithe barn, which were duly admired, Broadway was glanced at, and the view from the Tower, said to comprehend fourteen counties on a clear day, was to some extent taken in, though the mist which prevailed prevented the full extent being surveyed. When Buckland was reached the rectory was first viewed. The rectory house contains an ancient hall with some good fifteenth-century glass and carving. As in one of the windows appears the rebus of William Grafton, "a graft rising from a tun," the building of the hall, &c., may be attributed to this rector. Canon Bazeley described some of the interesting articles in the hall, and then a move was made to the church. The structure, dedicated to St. Michael, consists of a nave with north and south aisles, and a north porch, a chancel, and a square embattled tower at the west end. The three bays of the south arcade of the nave, and the two eastern bays of the north arcade, are late Early English or thirteenth century. They have plain chamfered arches with clustered semi-detached shafts and moulded bell-shaped caps. The responds of the two easternmost bays of the north arcade have each a single detached shaft. The chancel arch, the east and west windows of the north aisles, and a piscina in the south aisle, all belong to the thirteenth century church. At the east end of the nave on the apse of the gable is the cote which formerly contained the sanctus bell. The bell itself has been removed into the belfry, and is now known as the Ting Tang. Considerable changes took place in the fifteenth century. A clearstory was added to the nave, and the upper part of the tower and the western bay of the north arcade were built. The chancel was rebuilt, and the Perpendicular windows were inserted in the north and south walls of the nave. A low-pitched roof, as may be seen by the drip courses on the east wall of the tower, was substituted for the thirteenth-century roof. Some of the oak seats are relics of this second restoration; so also are the font and a richly-carved tomb on the north side of the tower. Canon Bazeley referred to the old plaster having been stripped from the walls. He said that architects were too fond of stripping off the plaster, which was often beautifully ornamented, and leaving the bare stone. They should be made to replace what was removed at their joint expense. Churches ought to be restored to something of their ancient state.

He explained the subjects in the ancient east window, saying that the glass was evidently of the time of Edward IV. It represented three of the seven sacraments—"Confirmation, Marriage, and Extreme Unction." There is a holy water stoup at the north door. In the nineteenth century restoration the plaster was ruthlessly stripped from the walls, and many interesting frescoes were irreparably destroyed.

Driving back to Broadway, the party were specially interested in the Grange. The fourteenth-century building, which is locally known as "The Priory," was originally a Grange of the Abbey of Pershore. When the Society visited it in 1884 it was found to be in a deplorable state of dilapidation, but it has been greatly improved by the present owner, Mr. F. D. Miller, and is now used by him as a studio. The Church of St. Eadburg was inspected. It is cruciform, comprising a nave, with narrow north and south aisles, a central tower, with external staircase at the north-east angle, north and south transepts, and a chancel. The north and south arcades of the nave are Transitional Norman, having each three bays with pointed arches, capitals with truncated cone mouldings and circular bases. Half the arches have square edges, the others are chamfered. The roof of the nave dates from the fifteenth century, and is somewhat higher than the pointed roof which preceded it. There are traces of thirteenth and fourteenth century work in the transepts and chancel. Most of the windows were inserted in the fifteenth century. The font is Early English. There is an escutcheon of Charles I., and a Jacobean pulpit with sounding-board, and another of fifteenth century work. A pillar almsbox is of an unusual form and very ancient.

Mr. Edgar Flower invited the Society to his residence, Middle Hill, situated on an eminence, and approached by a steep carriage drive. Middle Hill was built by Mr. William Taylor, Recorder of Evesham, in 1726, and was enlarged in 1776. It was for some time the abode of Sir Thomas Phillips, who filled it with his collection of manuscripts and printed works. It has been greatly improved by Mr. Edgar Flower, its present owner, who heartily welcomed his guests. They remained until the exigencies of railway travelling compelled them to seek their vehicles, and they were driven to Evesham, where the party separated, highly gratified with their three days' excursions.—The above has been abstracted from the interesting report which appeared in the *Western Press*.

BOOKS RECEIVED.

Hints and Suggestions as to the Planning of Poor Law Buildings. By Percival Gordon Smith, F.R.I.B.A. (Knight & Co.)

Construction of Roads and Streets. By H. Law and D. K. Clark. Sixth edition, with additional chapters by A. J. Wallis-Tayler. (Crosby Lockwood & Son.)

New Outfall Sewer at Aberdeen.—The Aberdeen Town Council has just accepted the tender of Mr. Peter Tawse, contractor, Aberdeen, to construct the portion of the main outfall sewer from Point Law under the new channel of the River Dee and thence to the sea at Girldleness, for the sum of 54,949*l.* 8s. 2d. Large iron pipes, 7 ft. diameter, will be used for carrying the sewer under the river, and on the Torry side of the navigation channel there will be a considerable amount of tunnelling through rock and deep excavations. The plans and specifications are by Mr. W. Dyack, M.Inst.C.E., Borough Surveyor, Aberdeen.

The Student's Column.

GAS AND GAS FITTINGS.

9.—Gas Pressure and Gas Governors, Pressure and Consumption Gauges.

When gas is required for the purpose of producing an illuminating flame it should be supplied at the point of ignition under very low pressure (say 0·6 in. of water), but when required for incandescent burners, or other burners in which air is admitted to produce a non-luminous flame, the gas should be supplied to the point at which it is injected into the mixing tube of the burner under a higher pressure (say 1½ in.). It is commonly stated that "atmospheric" gas fires are most efficient when supplied with gas under a pressure of about ¾ in., but although this may be true when coal-gas is used in nicely adjusted gas fires having clean burners and tested under favourable conditions in a room free from draughts, it is a statement which is likely to mislead the ordinary consumer.

In practice the burners are seldom perfectly clean, but are more or less covered with dust deposited from the atmosphere or dropped upon them from the overhead fireclay or asbestos fuel; consequently the gas ceases to issue in sufficient volume, becomes mixed with too large a volume of air, and "flashes back" when ignited, or burns with a short, noisy, green flame. Non-luminous flames, produced by admitting air before the point of ignition, have also a greater tendency to "flash back" under the influence of air draughts, caused by opening windows or doors, when the gas is supplied under a pressure of less than 1 in. than with gas under a higher pressure. Also the common practice of mixing carburetted water-gas with the coal-gas, and thereby increasing the specific gravity of the gas, necessitates the use of gas under a higher pressure than ¾ in. The main disadvantage attendant on the use of gas under high pressure is the hissing noise produced in the burner.

Initial or House Gas Governors.—The pressure of the gas as it leaves the consumer's meter varies considerably during every twenty-four hours in most districts, and to prevent it exceeding a certain limit at the points of ignition a governor is often affixed on the service-pipe close to the outlet of the meter. The object of the governor is to prevent wasteful consumption of gas, and to maintain a uniform pressure at the burners irrespective of the changes in the pressure under which the gas is supplied to the meter. When the pressure of the gas entering the meter is too low, or the meter itself is too small, governors are quite useless.

Governors should always be fitted in a level position, and in places where they can readily be inspected. By turning a screw or manipulating small weights the governors can be so adjusted that the pressure at the outlet will be maintained at any desired point lower than the pressure at the inlet. It is usual to recommend that the pressure be reduced to 1 in. when the usual number of lights are in use, but if incandescent burners or other appliances fitted with "atmospheric" burners are to be supplied in addition to burners for luminous flames, it is better to allow a pressure of 1½ in. at the governor outlet, and for the luminous flames to use governor burners, or Bray burners fitted with the "economisers" to be described in the next chapter.

The governor usually consists of a small chamber through which the gas flows, the inlet being partially closed by a small cone which automatically rises and reduces the size of the inlet orifice when the pressure increases, and which descends as the pressure decreases and thereby increases the size of the orifice through which gas can pass. In some governors the upper part of the chamber consists of a flexible leather diaphragm, which expands in an upward direction when the pressure increases and draws up the conical or semi-spherical plug which is connected to the diaphragm by a central spindle, and which controls the gas inlet orifice. The gas pressure required to raise the diaphragm and top plate is regulated by removable weights, or by turning a screw which regulates a spring pressing upon the flexible diaphragm. To obtain greater regularity of action the governor sometimes consists of two of these expansible chambers arranged side by side, and forms what is termed a "double dry governor."

In Peebles's "mercurial" governor a small gas bell floats in a cup containing mercury, the

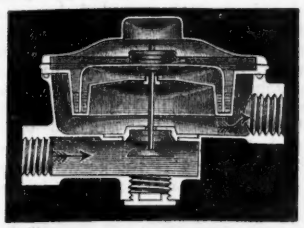


Fig. 15.—Peebles's Mercurial House Governor.

rise of the bell when the pressure increases causing a reduction in the size of the inlet orifice, and the gas pressure required to raise the bell being dependent upon the weight placed upon it.

One of these governors is sometimes attached to every appliance which consumes a large volume of gas, such as a fire or stove, as in such cases the saving effected by carefully governing the supply may be considerable.

Governor Burners.—Instead of, or in addition to, placing an initial governor at the outlet of the meter, the burners used may each be provided with a small governor, situated either in the body of the burner or immediately beneath it.

In Peebles needle burner (fig. 16) the chamber beneath the steatite burner tip contains a perforated conical float of white metal, and as the gas pressure increases the float rises and reduces the size of the orifice through which the gas escapes to the burner tip. The needle is an upright central metal rod which passes up inside the float and prevents it becoming tilted out of its proper position. The greater the pressure the smaller becomes the outlet orifice, while a decrease of pressure is accompanied by a descent of the float and consequent enlargement of the outlet orifice.

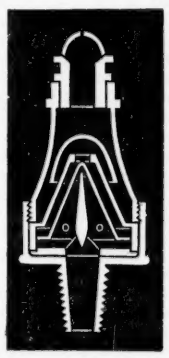


Fig. 16.—Peebles's Needle Governor Burner.

A great variety of burner governors are manufactured, but most of them depend upon the movements of a float which automatically reduces the size of the gas inlet or outlet orifice as the gas pressure increases, and enlarges it as the pressure decreases. They are mostly effective while maintained in good working order, but all require occasional inspection, as the accumulation of a little dirt within them, or the corrosion of the metal, is liable to put them out of action. Sometimes in float governors the float becomes jambed against the sides of the chamber containing it, and needs to be released by tapping the burner, or by unscrewing the base of the chamber and shaking it free.

Pressure Increases with the Elevation.—The specific gravity of coal-gas being much lower than that of air, the gas pressure increases as the height of the service-pipe above ground level increases, and decreases when the pipe is carried in a downward direction. A gasworks is usually situated on the lowest level in the district to be supplied, because a higher pressure is required to distribute gas downhill than uphill. The pressure on the top floor of a building is greater than in the basement, if no governor be employed. The increase in pressure is equal to about $\frac{1}{10}$ in. of water for every 10 ft. of elevation, and in lofty buildings a governor may with advantage be provided on the service-pipe at every elevation of 30 ft.

Pressure Gauges.—The simplest pressure gauge is a glass U-tube filled to about half its height with water, one end of the tube being open to the air and the other open to the air until connected to the gas supply-pipe. When both ends of the tube are open to the atmosphere the column of water is at the same height in both limbs; but when one limb is connected to the gas supply the pressure of the gas causes the water level to be depressed in one limb and to rise in the other. The height of the water level in the one limb above that in the other limb is measured in inches, and represents the pressure of the gas in inches of water. For convenience the water in the tube may be tinted with cochineal or soluble indigo, a scale graduated in tenths of an inch may be attached to the tube, and a stopcock and nipple may be fitted to the end of each limb; but these additions merely render the apparatus more convenient to use, and do not affect the accuracy of the readings.

Mercury Gauges.—For pressures higher than the maximum of 4 in. or 5 in. under which coal-gas is usually supplied, the U tube may be charged with mercury instead of water, mercury being 13·4 times the weight of water. Mercury gauges are sold having a scale on which the figures represent the pressure in inches of water, and the necessity of multiplying the readings by 13·4 in order to convert them into inches of water is thereby obviated.

High-pressure Gauges.—For measuring pressures of many pounds to the square inch spring gauges in a circular metal case, similar to those used for steam boilers, are employed.

Service-pipe Cleansers.—Service pipes and main-service pipes exposed to low temperatures sometimes become blocked with naphthalene or other matter deposited from the gas. To remove the obstruction the pipe is usually "blown out" with the aid of a force pump known as a "service cleanser," the removal being sometimes facilitated by introducing into the pipe a solvent, such as benzol, naphtha, or petroleum.

Consumption and Pressure Indicator.—Indicators are manufactured which show at a glance the approximate hourly rate of gas consumption of any ordinary gas-burner, and which may also be used as pressure-gauges. The consumption readings of the indicator vary with the specific gravity of the gas, and consequently an indicator adjusted to give correct readings with rich Scotch gas would not indicate correctly the consumption of burners tested with London coal-gas. The indicator must be adjusted by the manufacturer to suit the quality of the gas supplied in the district in which the indicator is to be used.

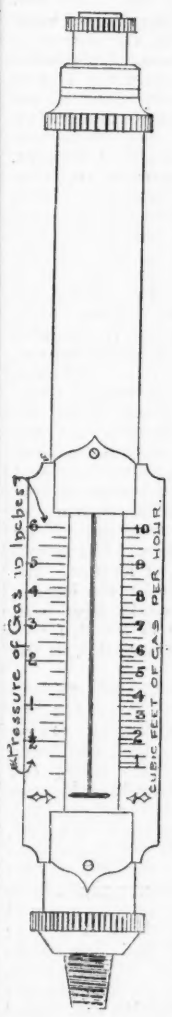


Fig. 17.—Consumption and Pressure Indicator.

To ascertain the rate of consumption of any burner the indicator is attached to the gas supply, and the burner is screwed into the top of the indicator. The gas entering the bottom of the indicator, passes through a glass tube, within which is a floating disc which rises to a height dependent upon the rate of flow of gas to the burner. On one side of the metal case containing the glass tube is a scale of cubic feet per hour, the consumption of the burner under examination being indicated by the position of the floating disc, which rises until opposite that figure on the scale which indicates the consumption. As the height to which the disc is raised is dependent upon the specific gravity of the gas, it follows that the instrument registers inaccurately when used with gases of widely different specific gravity, but for obtaining an approximate estimation of the consumption of different burners in districts supplied with gas of uniform specific gravity the apparatus is very useful.

To use the instrument as a pressure gauge a cap provided with the instrument is screwed on the top in place of a burner, and reference is made to another scale engraved on the opposite side of the metal case. The float rises as before, and the point at which the disc remains at a constant height indicates on the scale the pressure in inches of water of the gas under examination. Variations in the specific gravity of the gas do not affect the accuracy of the pressure indications.

Testing the Gas Fittings.—Gas services and fittings to be used with gas under ordinary pressures of less than 4 in. of water should always be tested under a pressure of 10 in. or 12 in. before being approved as gas-tight. A force pump and mercury or water-pressure gauge with connecting pieces form the whole of the apparatus required for testing; gas or air being forced into the pipes until the required pressure is obtained, and observation being made as to whether the pressure remains constant for a long period or gradually decreases. A leak-detector of this description is made by Harrison & Sheard, and quite recently a detector known as the "Wizard," in which benzoline is provided to render the air inflammable, and thus facilitate detection of the point of leakage, has been introduced by Falk, Stadelmann & Co.

[By a printer's error the sectional drawing of a dry meter (fig. 14), shown in the preceding chapter, was inverted.]

Correspondence.

To the Editor of THE BUILDER.

THE LATE MR. BRYDON'S GOVERNMENT OFFICES.

SIR,—It is strange that no one has suggested that for the superintendence of the above the Government should employ the late Mr. Brydon's highly-talented assistant, Mr. Arthur Hannaford, who was his intimate friend and *only* helper for a considerable time, and his right-hand man for years. Mr. Hannaford prepared details for most of his chief's works, including those in Bath; and I know that Mr. Brydon was most anxious to have his assistance again (he had left to go for health and study to Italy) when designing the Government Offices. It seems impossible to name a more suitable or better qualified man, as, considering the advanced state of the drawings at the time of Mr. Brydon's death, it would be easier for Mr. Hannaford to sympathetically work out the ideas of his dead friend and teacher than for other architects, who, if really "eminent," can less easily adapt themselves to another man's lines of work.

Whether Mr. Hannaford is available, however, I do not know. Z.

*** We gladly publish the letter of "Z.," who has no personal interest of any kind in the matter; but we are still of opinion that one of the most eminent architects of the day should be appointed to carry out the building, both in respect to the memory of Mr. Brydon, and as the best guarantee for the worthy execution of the work. Such architect, if appointed, might no doubt do well to avail himself, if possible, of the assistance of the gentleman named by our correspondent.—ED.

ARCHITECTURAL COURTS AT THE CRYSTAL PALACE.

SIR,—I do not know if your attention has been drawn to the present condition of the architectural courts of the Crystal Palace. After a lapse of some years, visiting Sydenham expressly to enjoy their beauties, I found my recollection had not done justice either to their extent or to the care with which they had been arranged. In some respects, the collection of casts surpasses that at South Kensington. The Medicean Dukes are not solitary, but supported by the allegorical recumbent figures; the Pistojan frieze is in one continuous length and at its proper height (although incorrectly coloured). There are no large models at Kensington of the Acropolis, the Pantheon, or St. Peter's, Rome, nor casts of English mediæval remains so varied as at Sydenham. But in what manner are these reproductions of the world's greatest art treasures displayed?

The principal Egyptian Court is now occupied by cooking-stoves, and its vistas destroyed by painted canvas backgrounds and imaginary battlefields, which at night produces a truly Egyptian darkness in the colonnades behind, duly appreciated by young people of both sexes. The Greek Court is appropriated to wounded and dying soldiers in khaki. The Roman Court has been execrably repainted, and is crowded with various casts of a period 1,500 years later than one would expect, and a series of models of modern battles, in glass cases. The Court of the Alhambra is evidently considered a "draw," for it has been properly redecorated and is free from intrusive objects. Truly the plants are not specially characteristic of Spain, neither does the untempered arc light (which effectually renders invisible the beautiful dome of the Abencerrages) recall the sunny clime of the Peninsula. The tile paving is worn plain, and the water plashes no longer in the fountain. However, some effort is made here to save appearances, and we

cross the nave hopefully to the Byzantine Court opposite.

Here, however, birds are in possession, and the large aviaries render many of the casts unapproachable. The Mediæval Court is in somewhat better order, although the French and German vestibules contain displaced casts of other periods and nationalities to the confusion of the student. The Renaissance Court is at present occupied by an exhibit of armour and military costume, the partial cause of the overcrowding of casts elsewhere.

That Queen Elizabeth is practically screened from view renders the fact that she is buried beneath cardboard boxes and old newspapers less noticeable. She has been exiled from her own Elizabethan vestibule as this is required for a club, which is also in complete occupation of the spacious Italian Court beyond, so that these portions are no longer accessible to general visitors.

We are frequently reminded of the difficulty the Palace Company have in keeping the building open without loss, and, giving them the credit of knowing their own business best, one can but feel that the space the courts occupy can, in their opinion, be more remuneratively employed. Certainly at present the courts only provoke sadness to that section of the public who really care about them, while those who do not care about them would not mind their removal. Therefore one would suggest that, failing their acquisition by Government (which is scarcely to be looked for after Lord Salisbury's recent speech on State encouragement of art), some enterprising city like Glasgow, Liverpool, Manchester, or Birmingham, should make an offer for their acquisition, and thus form a nucleus of a great architectural museum.

F. Herbert Mansford.

OBITUARY.

Mr. C. Abbey.—Mr. Charles Abbey, architectural sculptor, died at his residence at Rosemont-road, Richmond Hill, upon the 21st inst., aged sixty-five. Mr. Abbey was greatly esteemed by all who knew him. For some years he was in partnership with Mr. Charles W. Harrison in Dublin.

GENERAL BUILDING NEWS.

Congregational Church, Leeds.—The foundation-stone has been laid of the new Congregational Church in Woodhouse-lane, Leeds, which will take the place of the East Parade Chapel that was purchased by an insurance company for 31,000*l*. The new church, having a capacity for about 1,000 persons, is planned and designed by Mr. C. F. Danby, and will cost about 25,000*l*. It is proposed to insert a stained-glass window in memory of three former ministers, Dr Cuder, Dr. Reynolds, and the Reverend John Ely.

Church, Ballycotton, East Cork, Ireland.—The new Church of Our Lady Star of the Sea, recently built at Ballycotton, has just been dedicated. The style of the church is Romanesque. The dimensions are, roughly-speaking, 100 ft. by 50 ft.; height to ridge of nave 40 ft., and to cross of bell turret 70 ft. The nave is 25 ft. wide, and the aisles 12 ft. 6 in. each. The nave is separated from aisles on each side by arcades of five bays carried on columns of polished Aberdeen granite, with caps and bases of Portland stone. Above the bays of the nave there are on each side six clearstory cinquefoil windows, beneath which runs a string course internally of Portland stone. Between the chancel and nave there is a chancel arch springing from polished granite columns with Portland stone caps and corbels. There are two short transepts, gable roofed, which contain the altars, and the chancel portion of the aisles is separated from the body of the aisles on each side by arches. A winding turret stair of limestone leads to an organ gallery, which stretches across western end of nave, and beneath which there is a porch. The glass in this porch and in all the windows of the church is cathedral glass, and was supplied from the Youghal Art Works of Mr. Watson. For each of the six clearstory windows at each side there are two aisle windows, except in the spaces required for sacristy and porches. Behind each side altar there are two windows, and behind the high altar three. At the western end the nave is lighted by three windows, above which is a rose window. There is also a light at the western end of each aisle over the confessionals. The confessionals are of pitch pine, and made by Mr. Murray, of Youghal. The nave is filled with pitch pine benches made according to the architect's design by Mr. T. O'Brien, of Cloyne. The floor is of pine on breeze concrete, the porches and central passages being tiled. There is also encaustic tiling along the whole width of the sanctuary, all the tiling being the work of Mr. Nicholas Sisk, of Cork. The high altar of marbles and mosaics is by Mr. E. Sharpe, of Dublin. The walls lined with Youghal brick, are externally of Little Island limestone in pitch-faced ashlar masonry, set and pointed in cement. The architect is Mr. G. C. Ashlin, of Dublin, and the contractor is Mr. Jerh. J. Coffey, of Middleton.

School, Giggleswick, Yorkshire.—On October 4 the new chapel which Mr. Walter Morrison has presented to the Giggleswick Grammar School will be formally inaugurated. Externally the building is constructed of red and white stones, the dome, which is octagonal in plan on its exterior and nearly semicircular in section, being covered with copper. There is a small lantern with a cupola over the eye of the dome. In the interior marble, mosaic, carved wood, and stained glass have been plentifully used. The interior of the dome is covered with mosaic. Around the small eye, which admits light from the lantern, are figures of winged saints with golden halos. On the lower part of the dome are a series of angelic figures with uplifted wings, most of them bearing musical instruments. At the crossing of the transepts are four large figures of the Evangelists. The floor of the church beneath the dome is arranged as choir stalls, and is paved for the most part with black and white marbles. Immediately beneath the centre of the dome is a disc of Italian Brecchia, and around this are arranged in a circular design a pavement of verde antique and other marbles, including specimens of grey and green marbles from Ireland, Italy, and Greece. The northern transept is occupied with an organ loft, and in the south transept is a small gallery. The transepts and nave have waggon-head vaults, the former being stencilled with decorative designs. Most of the boys of the school will occupy seats in the nave, and at the west end are stalls for the masters. The nave aisles are very narrow, and will serve only as passages. They open into the church by three round-headed arches, with decorated capitals. The fronts of the organ and of the galleries and the stalls are designed, in harmony with the rest of the building, in the Tudor Gothic. The ends of the seats to be occupied by the boys have also elaborate carved borders, in which the foliage of many of the local plants is reproduced. The whole of the woodwork is of cedar. In convenient niches are to be placed statuettes of the late Queen Victoria and of King Edward VII., commissions for their execution having been placed with Mr. George Frampton, A.R.A. The windows are nearly all filled with stained glass. The east window is scriptural, the principal subjects being the Sermon on the Mount and the Ascension The west window is circular in shape. It shows the sun, moon, and stars, the earth, with the Tree of Knowledge in its centre, and the waters under the earth. Beside the Tree of Knowledge stand Adam and Eve, and around them are representatives of most of the principal groups of animals. The lion, tiger, rhinoceros, hippopotamus, reindeer, ox, sheep, kangaroo, crocodile, many birds, including the flamingo, and many fishes are depicted. In the nave windows are the full-length portraits of some of the great figures of our history. Alcuin, William of Wykeham, and Arnold of Brescia represent the monastic life. King Edmund, the saint and martyr, Sir Thomas More and Bishop Latimer are taken as representing the non-monastic religious life. Wycliffe, Bunyan, and Wesley are the typical Puritans. Columba, Henry Martyn, and Livingstone represent the noble band of missionaries. King Alfred, Sir Philip Sidney, and General Gordon are the fine types of English military life at its best, and Cædmon, Milton, and Tennyson represent English literature. A fine organ has been built in the church by Messrs. Henry Willis & Sons, of London. The stained-glass windows are all by Messrs. Burlison & Grylls, of London. The mosaic work is by Messrs. Powell & Son, of London. Mr. George Murray is the artist engaged in the decoration of the church; and the works have been carried out under the supervision of Mr. R. Evans as clerk of works. Mr. T. G. Jackson, R.A., is the architect.—*Bradford Observer.*

School, Perth.—The new Central District School, Perth, occupies the site of the old Middle Church Parish School in the Meal Vennel. Owing to the peculiar shape of the ground, it was found desirable to have all the classrooms facing one direction, in order to get the full benefit of the open space for light and air, and it was found necessary to construct the new school three stories in height. On the ground floor of the new school are three infant classrooms, each seated for seventy-two pupils; one spare classroom for forty pupils, to be used as a demonstration cookery classroom; a central hall, which rises the full height of the three stories; bathroom, cloakrooms for infants and girls, female teachers' retiring-rooms, boys' and girls' entrances, and staircase at either side. On the first floor are classrooms for Standards I., II., and III. each seated for sixty pupils; a combined workshop and practical cookery classroom for eighteen pupils, boys' cloakroom, and headmaster's private and retiring-rooms. The second floor contains three classrooms for Standards IV., V., and VI., each seated for sixty pupils. The walls of the central hall, staircases, and corridors have dados of cream-coloured tiles, and the classrooms have yellow pine dados to a height of about 5 ft. The architect is Mr. G. P. K. Young. The following are the principal contractors:—Masons, Messrs. Fraser & Morton; joiners, Messrs. James Hay & Son; plumbing work and heating, Messrs. Frew, Watson, & Co; plasterer, Mr. A. M'Ritchie, Dundee; slaters, Messrs. James Buchan & Son; glazier, Mr. C. Alexander; electric lighting, Messrs. Frew, Watson, & Co.; clerk of works, Mr. Robert Smith.

Municipal Technical College, Sunderland.—The foundation-stone of this building, which is situated in Green-terrace, near Bishopwearmouth Parish Church, was laid about a couple of years ago, and the formal opening of the completed edifice is to be performed on September 13. Designs for the new building were accepted in competition from Messrs. Potts, Son, & Hennings, architects, of London, and the building contract was secured by a local man, Mr. J. White, whose original tender was 17,683*l*, which, with the addition of various extras, will closely approach 18,000*l*. The building is English Renaissance in style, of red brick, with buff-coloured terra-cotta. The most conspicuous feature of the building is the corner block, which has been carried up as a square dwarf tower, topped by a miniature dome. In the basement, in addition to the physical laboratory, the heating apparatus, &c., provision has been made for working machinery, testing machines, and workshops fitted with all the requisite mechanical appliances. Chief among the various rooms on the ground floor is the examination and lecture hall, which measures 70 ft. by 30 ft.; while the leading divisions on the first floor are the chemical laboratory, which is 70 ft. long, 30 ft. wide, and 29 ft. high, and the chemistry-lecture theatre, these rooms having respectively accommodation for eighty-four and sixty students. On the second floor and in the tower are rooms for astronomical study.

Co-operative Stores, Birtley, Durham.—The foundation-stones of the new co-operative stores, at Durham-road, Birtley, have just been laid. The buildings are to be erected for the Birtley Co-operative Society by Mr. John Jopling, of Birtley, from designs prepared by Messrs. Liddle and Browne, Newcastle. The site is in the centre of the village, and occupies a position facing the Durham-road. The front of the building is to be of Ruabon red facing brick with stone facings, and it will have a frontage of 265 ft., and a depth of 133 ft. There will be eight shops on the ground floor, and on the first floor a large hall to seat 900 people. Provision will also be made for club and committee rooms, with secretary's and cashier's offices, &c. The whole is to be lighted by electricity, and plant will be laid down for that purpose. The total cost of the new premises is estimated at 20,000*l*.

Addition to the National Gallery, Dublin.—The work of building an addition to the National Gallery in Leinster Lawn, which was commenced in January, 1900, is fast drawing to a close. The building is an oblong structure, with a frontage facing Leinster Lawn of 54 ft., and a depth towards Kildare-street of 230 ft., and consists of basement, ground and first floors. The design is the work of Sir Thomas N. Deane & Son, the front being Italian Renaissance in style. The entrance is through a portico into a hall on the ground floor, off which will be the approaches to the basement and first floors. The basement is wholly occupied by store-rooms and the boiler-room, from which the entire building will be heated on the radiating principle. The ground floor, which will be the main gallery of the new building, contains, besides lavatories and other necessary arrangements, seven rooms, each room being about 30 ft. square and lighted from the north and south sides by fourteen side windows, 10 ft. by 14 ft. These rooms will contain the bulk of the gallery exhibits. The first floor will also contain seven public rooms besides the directors' apartments. The floor will be lit from the roof by lantern lights nearly 24 ft. square. The contractors are Messrs. Meade & Son. The building is fireproof throughout, the flooring being of steel joists and breeze concrete, and being finished on the ground floor in teak parquet, and on the first floor in Riga oak and pitch pine. The roof is flat, finished off with iron railings. The front elevation and part of the side elevation are in Portland stone and Ballyknocken granite from Osborne's quarries. The remaining stonework is Co. Dublin calp from Messrs. Meades' own quarries. The window dressings are of Athy stone brick. The Portland stonework was executed in Messrs. Meades' shop under the personal supervision of Mr. John Brophy. The woodwork throughout has been carried out in Messrs. Meades' premises under the supervision of Mr. Joseph Clarke. The carving is being executed by Messrs. Harrison & Sons. The total cost of the building will be about 30,000*l*.—*Irish Independent.*

Napsbury Lunatic Asylum.—On the 20th inst., at the Guildhall, Broad Sanctuary, Westminster, Mr. E. A. Sandford Fawcett, A.M.Inst.C.E., the Inspector appointed by the Local Government Board, held an inquiry respecting the application of the Middlesex County Council to that authority for power to raise by loan the sum of 250,000*l*. for the purposes of the new lunatic asylum which they propose to erect at Napsbury, St. Albans, Herts. The County Council was represented by its architect, Mr. Rowland Plumbe, and the Deputy-Clerk, Mr. W. J. Austin. The site has been already purchased at a cost of about 50,000*l*., and the foundations for the main building are nearly completed. The new asylum, which is much needed to relieve the pressure upon similar institutions in Greater London, will be constructed to accommodate a total of 1,150 inmates.

Convalescent Home, Sandgate.—On the 17th inst. the Alfred Bevan Memorial Convalescent Home for Men, Women, and Children, was opened at Sandgate. The institution, which was formerly known as the Beach Rocks Hospital, has been rearranged as an auxiliary to the Morley House Seaside Convalescent Home for Working Men, Dover, and is intended to perpetuate the memory of the late Sir Alfred Henry

Bevan. Mr. G. D. Stevenson was the honorary architect.

ART SCHOOL, FALMOUTH.—The foundation-stone of the new school of art, in Manor Drive, Falmouth, which is to be a memorial of Miss Anna Maria Fox, was laid on the 19th inst. The architect is Mr. O. Caldwell, of Penzance.

ALTERATIONS AND IMPROVEMENTS, PRINCE'S THEATRE, MANCHESTER.—The Prince's Theatre has been altered and improved. Mr. J. Bland was the contractor for the structural alterations and the contract for the decoration and upholstery has been carried out by Messrs. J. Binns & Sons, of Halifax The structural and decorative work has been executed from the drawings prepared by the architects, Messrs. Darbyshire & Smith, and carried out under their personal superintendence.

NEW PUBLIC BATHS, WEST HAM.—It is announced that the Town Council of West Ham have resolved to build a swimming-bath, having a water area of 100 ft. by 35 ft., together with a Turkish bath, slipper-baths, and waiting-rooms. Provision will be made for using the swimming-bath, during the winter months, as a hall or gymnasium, and for the accommodation of 1,000 persons in the gallery and the additional floor-space which can be obtained by folding the dressing-boxes against the walls.

DRURY-LANE THEATRE.—During some weeks past extensive alterations and improvements of the interior of the auditorium have been in progress —the structural works being carried out by Messrs. Patman & Fotheringham, under the directions and superintendence of Mr. Philip E. Pilditch, who also has designed a scheme for the new upholstery (by A. R. Dean, Limited) and decoration. The improvements comprise a reconstruction of the stalls and the grand and first circles, the steel work for which is by Messrs. Drew-Bear, Perks, & Co., together with the removal of some of the boxes on the stall-floor, the widening of some of the gangways, a new exit-door in Russell-street, a fresh system of ventilation throughout the whole of the building, and a re-installation of the electric light supply in two services, either one of which will be available, in case of accident, for replacing the other, so that in such an event a recourse to gas will not be necessary.

CATHOLIC SCHOOL, ABERDEEN.—On the 15th inst. the new Roman Catholic School in Summer-street was opened. The school takes the place of the former Convent School in Huntly-street, which has become inadequate for the purpose. The new school was designed by Mr. R. G. Wilson, architect. Including the site, it has cost altogether over 5,000*l.*, and provides accommodation for 267 pupils.

PUBLIC BATHS, CORK.—New public baths have been erected at Cork. There are two baths, each 75 ft. long by 30 ft. broad. The floor is an inclined plane, thus securing at one end a maximum depth of 6 ft. 6 in., and at the other the minimum depth of 3 ft. 6 in. The baths are approached at each corner by wooden stairs, and the bottom and sides are lined with white glazed brick, with two lines of coloured brick along the centre. Each bath is provided with fifty-eight dressing-boxes, and eight douche baths are attached to each swimming apartment. The main apartments will be lighted by two arc lamps, and the douche baths and other portions of the premises will be lighted with incandescent lights. There is a glazed roof. The dressing-boxes are made portable, so that in the winter-time, if it were found unnecessary to use both baths for swimming purposes, the boxes could be taken down, and the tank temporarily floored over and used as a gymnasium or for other public purposes. Attached to the bath premises is a steam laundry. The buildings are approached from Eglinton-street, there being two separate doors, one for each bath, with a central ticket office from which control of both baths can be obtained. The baths were erected under the superintendence of the City Engineer (Mr. H. A. Cutler).

SANITARY AND ENGINEERING NEWS.

LINLITHGOW DRAINAGE SCHEME.—The work of opening the pipe track in connexion with the new drainage scheme for the burgh of Linlithgow has commenced. The contractors are Messrs. Blair & White, Glasgow, whose offer for executing the work amounts to 5,164*l.* 18s. 11. The Council have now asked Messrs. Warren & Stuart, the engineers, to have the specifications for the septic tank works submitted without delay.

ABERDEEN HARBOUR IMPROVEMENTS.—In connexion with the erection at present going on of the single-swing bridge (with double line of rails) in line with Marischal-street, and between Victoria and Upper Docks, Aberdeen, the Harbour Commissioners are now to construct a temporary bascule bridge—64 ft. apart between pivots or axles, 14 ft. in width, being two footways 3 ft. wide each and a carriageway of 8 ft.—of strong steel, able to carry a six-ton lorry and a crowd of people. The work will be carried out by Messrs. Abernethy & Co., Ferry Hill Foundry, Aberdeen; and it is intended that the bascule bridge be utilised by being shifted to other parts of the dock when required. The plans are by Mr. R. G. Nicol, Harbour Engineer.

STOCKPORT AND ITS WATER SUPPLY.—The growth of the borough of Stockport and of the residential and manufacturing districts surrounding it convinced the Corporation of the necessity of extending their water supply, and they have prepared a scheme which, when carried out in its entirety, will relieve the district of anxiety in the matter of ample provision for many years to come. The new gathering ground is provided by the great district of Kinder Scout. The scheme received the sanction of Parliament in the past session. It provides for the construction of three reservoirs at Kinder, in the parish of Hayfield. The reservoir to be first constructed will be made by an embankment across the river Kinder. The storage capacity thus provided will be equal to 624,000,000 gallons, and will give a daily supply of 2,000,000 gallons. The reservoir to be made as a second instalment of the work will be formed by the making of an embankment across the river Sett. Here a total capacity of 310,000,000 gallons will be created, with a daily supply of 1,500,000 gallons. As a third instalment a reservoir will be formed at Hollingworth Clough, with a capacity of 60,000,000 gallons, allowing for supply purposes 750,000 gallons per day. Adequate arrangements are made for the supply of compensation water. The total gathering ground is 4,560 acres. At the foot of the Kinder reservoir filter beds will be constructed, and from thence ample provision will be made for supplying the area included in the Stockport district. The engineer of the scheme is Mr. James Mansergh. The construction of the first of the three reservoirs will be commenced in the early spring. A period of ten years is fixed in the Act of Parliament for the completion of this portion of the works, but it is expected that it will be finished in seven or eight years. The Corporation obtained powers under the Act to borrow 756,000*l.* for works and 64,000*l.* for the purchase of lands, drainage, &c., in connexion with their scheme. The cost of the first reservoir, with the necessary mains, filters, service reservoirs, &c., is estimated at 350,000*l.*—*Manchester Guardian.*

PUMPING PLANT, ETSA DRAINAGE STATION, EGYPT.—We are informed that Messrs. Easton & Co., Limited, of Westminster, have secured the order for the pumping plant for the Etsa Drainage Station. The plant in question consists of six Lancashire boilers, two economisers, four vertical compound condensing engines direct coupled to four large centrifugal pumps, with all necessary steam and exhaust pipes, feed pump and feed-pipes, &c., and is designed to raise 6,500,000 gallons of water per hour against a head of about 15 ft.

SEWAGE SCHEME, WINDERMERE.—The Urban District Council have instructed Messrs. Beesley Son & Nichols, Civil Engineers, of Westminster, to prepare a scheme for the sewerage and sewage disposal of the town.

FOREIGN.

FRANCE.—The brick and iron church of St. Michel at Batignolles (Paris) is to be pulled down and replaced by a new church on a great scale.——M. Rochet, the architect to the Académie de Médecine, has received instructions to erect a crematorium in connexion with the Ecole Pratique de Médecine, Rue Racine. The special object is to dispose of bodies which have been the subject of post-mortem dissections, which have hitherto been interred at Père-la-Chaise.——The fine monument to Mdlle. Clairon, by M. Gauquié, illustrated some time since in the *Builder*, has just been finally erected at Condé-sur-l'Escaut.——M. Sandier, the architect who directs the art-work at the Sèvres manufactory, has been superintending the design and execution of a tower in porcelain, nearly 150 ft. in height, which is to be erected at Saint-Cloud, on the site of the former erection known as the "Lantern of Diogenes," which was destroyed by the Germans in the war. The site forms the highest point of the Saint-Cloud park.——The Public Works Department is about to construct a bridge over the Garonne at Bordeaux, opposite the Place Richelieu, in the form of a suspended travelling car.——A new Lycée is to be built at Paris, as an annex to the Lycée Buffon in the Boulevard Pasteur.——A committee has been formed at Paris to erect a monument to the celebrated furniture artist Boulle, whose name is permanently associated with a well-known type of French furniture of the seventeenth century. The design of the monument is entrusted to M. E. Jacques, sculptor, and it will be erected at the angle of the Faubourg St. Antoine and the Rue de Reuilly.——M. Gabriel Ruprich-Robert, architect-in-chief to the Commission des Monuments Historiques, is carrying out some researches and excavations on the summit of Puy-de-Dôme, among the ruins of a Roman building commonly known as the "Temple of Mercury." He has already brought to light a number of interesting relics, including a fine Corinthian capital in good preservation, and various specimens of pottery and coins of the Roman period.——A new basin is to be formed at the port of Boulogne, at an estimated cost of six million francs.

THE ARCHITECTURAL ASSOCIATION.—The prize of a silver medal and ten guineas, offered for the best monograph of Sir John Vanbrugh, with suitable plans and photographs, has been awarded to Mr. Gilbert H. Lovegrove, son of Mr. Henry Lovegrove, District Surveyor of Shoreditch

CAPITAL AND LABOUR.

STATE OF THE BRADFORD BUILDING TRADE DISPUTE.—The dispute in the Bradford building trades has now extended over sixteen weeks, and the prospects of any settlement appear to be as remote as they were when matters were brought to a crisis on May 1. Both employers and workmen are as firm in their attitude as ever, and to this extent the position of affairs may be said to remain unchanged, but in another aspect the situation can scarcely be described as so acute as it was in the earlier stages of the difficulty, from the point of view of either side. For some time past there has been a steady importation of non-society labour, until now, so far from building operations in the city being practically at a standstill, as was the case for some months, workmen officially stated to number two or three hundreds are engaged on several of the largest building undertakings. These include the Cartwright Memorial Hall, the Green-lane Board Schools, the electricity extension works, and the new Conditioning House. Mr. W. A. Forshaw, who has charge of the new labour bureau, reported that day by day a satisfactory number of applications are received, and that the new workmen are started as soon as their credentials are verified. He hazarded the opinion that, if the present rate of applications is continued, the places of the trade unionists will have been entirely filled up in the course of another month or so. It was also stated that there is a steady supply of masons, and that, at present, more joiners are forthcoming than the agency can provide with immediate employment. Mr. Forshaw declared that, in spite of the criticisms of the unionists, the quality of the work done by the non-society men is quite satisfactory. On the other hand there is a corresponding activity among the two trade societies mainly affected by the dispute in drafting their members to other districts. On May 1 the number of carpenters and joiners thrown out of employment was about 400, and the policy pursued has reduced the number on the books to 200. Similarly, as to the masons, the number on the books of the Bradford branch has diminished from about 500 to just over 300. It is stated that there is considerable activity in the building trade generally, and that in the great majority of cases the men have no difficulty in obtaining as much as 10½d. an hour, which, of course, is a penny an hour higher than the rate of wages upon which issue has been joined in Bradford. Some indignation has been aroused in the union by an assertion that its members are receiving a larger weekly allowance than their wages would ordinarily average in the course of a year. The allowance at the commencement of the dispute was 14s.; afterwards it was increased to 15s., and now so much support is forthcoming from other branches in sympathy with the Bradford men that the pay has been increased to 24s. a week, beyond which it is not likely to advance, however large the funds at disposal.—*Bradford Observer.*

MISCELLANEOUS.

PROPOSED ENLARGEMENT OF PADDINGTON TOWN HALL.—The Paddington Borough Council is considering a scheme for enlarging the present Town Hall at Paddington Green at an estimated cost of 20,000*l.* The scheme is being opposed on the ground that the building is not suitable for extension purposes and that a new building should be erected, even though it cost 50,000*l.* or 60,000*l.*

LEEDS MASTER BUILDERS' ASSOCIATION.—The annual meeting of the Leeds Master Builders' Association elected Mr. John Pickard president for the ensuing year. Other appointments were made as follows: Vice-president, Mr. G. Wilson; secretary, Mr. W. C. Ellisdon; committee, Messrs. J. T. Wright, W. H. Dews, W. Airey, C. Myers, W. Simpkiss, W. Oakes, and G. W. Nettleton.

THE ORDNANCE SURVEY.—During the twelve months ending with March 31 of this year the progressive work of the Ordnance Survey has been hindered through the absence of one-third of the officers upon the establishment who were withdrawn for active service in South Africa. In the course of the period under review the authorities published maps covering 4,950 square miles—an aggregate so far of 23,255 square miles—of their revision of the cadastral survey of all the counties of England and Wales, on the 1-2,500 scale, which was completed about twenty years ago. In the new series of 1-in. outline maps, of which the issue was begun in 1893, a fresh classification has been adopted for both public and private roads. In the first class are placed those which lead from one town to another and have a minimum width of a 14-ft. metalled roadway. The second class includes other metalled roads in a good state of repair and available for fast-wheeled traffic at all seasons, from and to villages, towns, and so on; all other metalled roads fit for wheeled traffic are assigned to the third class, whilst the fourth class includes unmetalled roads only. A coloured issue is made of these 1-in. maps for a large part of the South of England, mounted on canvas, and either flat or folded in a cover, for a charge of 1s. per sheet, measuring 18 in. by 12 in. The colours adopted are burnt sienna for metalled roads, brown for hill shading, red for contours, and blue for

water. Of the reduction, to a scale of four miles to the inch, based upon the 1-in. survey thus revised, the Department have now published sheets representing 31,515 square miles of England and Wales. They have just completed the publication of the 1-2,500 maps of the cultivated parts of Scotland, having during the last twenty years made and issued their surveys for the counties of Edinburgh, Haddington, Kirkcudbright, Wigtown, Fife, and Kinross, and the Lewis. The one-inch outline maps of that country are revised and finished. Ireland is being re-surveyed, by an increased staff, on the 1-2,500 scale. The field revision and drawing are concluded for the new one-inch maps, and the whole country has been surveyed for the publication (which is now completed) of maps to a scale of 6 inches to one mile. The departmental publications, indexes, maps, &c, can now be obtained at most provincial post-offices, but it does not appear that the public have largely availed themselves of that medium of purchase.

CARRARA MARBLE INDUSTRY.—An official report published by the Italian Ministry of Agriculture, Industry, and Commerce shows the number of working quarries in the districts of Carrara, Massa, and Versilia to be 528, the number of quarrymen and workmen employed being 10,215. The year's output was 94,832 tons of sawn marble and 14,985 tons of worked marble, of the aggregate value of £421,301. The United Kingdom takes about 20 per cent. of the marble exported, France 14 per cent., Germany 11 per cent., and the United States 22 per cent. The actual quantity shipped to England was 10,653 tons of block, 19,706 tons of sawn, and 7,398 tons of "otherwise worked."

CHERBOURG STONE.—Writing from Cherbourg, Mr. Loftus, the British Consul, remarks:—"There are several firms engaged in stone-quarrying here, all of whom appear to be doing well, and showing an ever-increasing business. The stone derived from the Cherbourg quarries is principally adopted for use as road metal; the stone is broken by hand, and is shipped mostly in British vessels to ports in the south of England, such as Poole, Shoreham, Southampton, Newhaven, Dover, Ramsgate, Margate, Herne Bay, Rochester, Stroud, and the Thames. The stone shipped to these ports is termed screened, the stone being broken into pieces ranging from 1½ to 2½ in. in size. A slight misconception of terms should here be noticed, namely, that what is usually termed granite in England is here (Cherbourg) known under the name of quartzite, and it differs from the granite proper as found in the neighbourhood of Fermanville and Dielette in being much softer. A somewhat cheaper kind of stone is shipped to Llanelly and Bridgwater. The main trade is, however, in screened stone, and this export has shown a large increase during the last few years. The Cherbourg Quartzite Company, Limited, shipped 34,000 tons, the Kent Road Maintenance Company 55,483 tons, and other firms about 2,885 tons."

LEGAL.

A BUILDING DISPUTE SETTLED.

THE case of Savory *v.* Revill came before Mr. Justice Joyce, sitting as Vacation Judge in the Chancery Division, on Wednesday last.

Counsel stated that this was a motion to restrain the building of a wall. The case was in his lordship's list on the 21st inst., and stood over in order to allow the architects on both sides to meet and arrange terms. Those gentlemen had met and had been successful in coming to terms, and it was therefore desired to take an order in the terms of the minutes.

His Lordship: Signed by the junior counsel?

The learned counsel stated that the minutes had been signed by the solicitors for the parties in pencil. The other side were not now represented by counsel.

His Lordship said the other side must be represented by counsel to enable him to consent to the order as asked. He could not accept mutual undertakings, as these were, signed by the solicitors. On the learned counsel producing a consent brief, signed by counsel on both sides, to the registrar the order could go.

The learned counsel stated that this would be done.

BUILDING DISPUTE AT NEWCASTLE.

THE case of Reid *v.* Sanderson came before Mr. Justice Joyce, sitting as Vacation Judge in the Chancery Division, on Wednesday last, on a motion by the plaintiff for an interim injunction to restrain the defendant from erecting a certain building at Newcastle which would interfere with plaintiff's ancient lights.

Mr. Bramwell Davis, K.C., stated that the parties had been able to arrange matters. The property in question had been sold, and it had been arranged that the action should be discontinued, the plaintiff undertaking to bring no subsequent actions against the defendant, each party to pay their own costs. That settled the matter in dispute completely.

Mr. Alexander, K.C., who also appeared on the motion, said he consented to the arrangement mentioned by his learned friend.

Order accordingly.

BUILDING DISPUTE IN THE CITY.

THE case of Wriford *v.* Patrick came before Mr. Justice Joyce, sitting as Vacation Judge in the Chancery Division, on Wednesday, on a motion by the plaintiff for an interim injunction to restrain the defendant from building so as to obstruct the plaintiff's ancient lights.

Mr. Maugham for the plaintiff said that last week his lordship gave him leave to serve the defendant with the notice of motion and the writ, but it had been impossible to serve the notice of motion and the writ, and he had therefore to move *ex parte* for the injunction. He thought the truth was that the defendant, knowing that the action had been commenced against him, had made it difficult to serve him. The *locus in quo* was in Wood-street, Cheapside. The defendant himself was the building owner, and was himself a builder. He had a place of business in London, and he was also by his agents carrying on the building in question in the City of London. The writ and the notice of motion had been taken several times to his business address in the Westminster Bridge-road and to the place where the work was being carried on. The persons in charge of both places knew the defendant's present address, which was in the country, but declined to give it.

His Lordship, having looked at the plans, asked how long the building had been going on.

Mr. Maugham stated that the defendant started building last February, and ever since the plaintiff had been anxious to see the plans. The idea of the defendant undoubtedly was that if he could get the building up before he was stopped, the Court would not order him to pull it down. He (counsel) had several affidavits in support of the motion. Mr. Adams, architect and surveyor, had made an affidavit that the defendant's building would interfere to a highly objectionable degree with the plaintiff's ancient lights.

His Lordship: What do you ask for?

Mr. Maugham said he asked that the defendant should be restrained from interfering with the plaintiff's ancient lights until the trial.

His Lordship, after consulting with the Registrar, said he would give the learned counsel an order for substituted service of the writ and notice of motion on the manager or any clerk of the defendant by leaving copies at his place of business with the manager or a clerk there, or by leaving them with the foreman, architect, or any person in authority at the building in question. If this were done, and a copy of the writ and notice of motion were also sent by registered letter to the defendant at his place of business and the building, the learned counsel could take an *ex parte* order in the terms of the notice of motion, but subject to the defendant having the right to get it discharged on his showing that it ought not to have been made. The plaintiff would, of course, give the usual undertaking in damages.

Order accordingly.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

7,690.—A DRILL-BRACE: *P. C. Carstensen.*—In order that the feed-screw shall not be turned too far out of its nut, it is fitted with a shell of which the flange is notched, and is to be passed over lugs upon the nut as the drill is put together. Thus three or four threads will remain in the nut by impact against the projections concurrently with the feed of the drill.

7,695.—A WALL-PLUG FOR ELECTRICAL PURPOSES: *S. S. Galsworthy.*—The solid porcelain or similar base of the plug is pierced with pin-holes and a cap is screwed on to it. Nuts secure the square-headed pins. A grip for the wire is supplied by grooves and projections upon the base of the plug, which may have either a lug that fits into the socket, or a recess that will engage with a projection thereon.

7,715.—A WOOD-SAWING MACHINE: *E. Pollard and Pollard & Metcalfe.*—A compounded vertical and horizontal movement is given by the mounting of the saw upon a slide which a pivoted lever worked with a cam-groove upon a cam-disc will move vertically so as to feed the saw forwards and backwards. Another cam-groove upon the opposite side of the cam-disc works a swinging frame or lever that hangs from a pin, and to which a slide from the saw-shaft is pivoted, whereby the saw receives a horizontal movement equal to that of the lath or other material which a roller and a flat piece, carried by angle-levers, press against the table. Confer also No. 11,549 of 1898.

7,733.—AN ARTIFICIAL GRANITE; *W. F. M. Blackburn.*—An admixture is made of suitably coloured crushed marble chips and Portland cement moulded under pressure in a moist state. The block is immersed for some while in water, is allowed to become hard, and may then be rubbed and polished.

7,750.—A CONTRIVANCE FOR ROOFING PURPOSES: *W. R. Pryke and W. Palmer.*—So that their front edges may be lifted up, and that at the same time their backs may be kept away from the wall, the eaves-gutters are fashioned with flanges or projections upon their sides.

7,762.—A CHIMNEY-TOP: *H. John.*—The chimney-top is made up of a short pipe of which the square section at the foot-flange is merged into a round section at the top, and which is fastened on to the brickwork with four interior footplates. The footplates are loosely joined together with angle-pieces having holes with burred lips and teeth; upon each plate is also fashioned a cross-rib for a similar rib in the lining of mortar. The pipe carries a rotatory hood within which is a frictionless collar that fits the thickened base of the pivot-pin of the hood. The steep forms of the hood and its vane are devised for their being easily packed within the pipes, and for their being employed upon chimneys in close proximity to one another. In the case of tallboys an extension of the pipe in which spring ears have been cut is substituted for the footplates.

7,765.—A SIZE: *P. Grosfils.*—The size is intended for use in the preparation of water-colours or distemper, or in painting wall-papers, and in sizing surfaces, it is composed of common starch that has been dissolved in diluted nitric acid; it will then constitute a liquid glue which, it is stated, will remain for a long time in a liquid condition.

7,766.—AN APPLIANCE FOR USE WITH CAGE-LIFTS: *P. F. Cantlion.*—The inventor seeks to furnish means of arresting the cage automatically at the ends of its travel. At those times a projection from the hydraulic cylinder of the piston-rod will engage with either one of two pivoted Y-shaped levers which are joined crosswise with rods whose lengths can be suitably adjusted. To one of the Y-levers a throttle-valve is joined by means of a rod. The valve can be closed by the action of the projecting lug, which rocks the one Y-lever towards the right, and so turns the other Y-lever in the contrary direction.

7,806.—ADJUSTMENT OF WINDOW SASHES: *J. W. Cropper.*—The sashes are attached with sliding bolts to sliding stiles upon one side of the frame, and are hinged on to rebated sliding stiles upon the other side of the frame; the bolts are shot back into sockets in the pulley stile, the sliding stiles being thus kept in their places. When one turns the sashes upon their hinges, and for the turning of the upper sash into the room, the lower sash will enter a recess made in the window-head, which has a ventilation space opening into the air outside, flaps of mica or other material being fitted upon the middle board, which is perforated.

7,815.—APPLIANCES FOR WINDOWS: *R. R. Thom and S. McCall.*—The lower sash is caused to slide in the frame and turn inwards upon lower pivots, whilst the upper sash is pivoted at the bottom rail within the frame, the sash-cords are secured to the rebated or grooved edges of the lower sash and are thence passed around guide-pulleys or through eyes upon the frame and the upper sash, which can be sustained in any position desired by means of the friction between the cords and the hooks or pulleys. For fastening the sash in a partially-opened position there are sliding bolts within the meeting-rail of the lower sash that will engage with grooves cut in the upper portion of the frame and can be shot into holes in the frame. Provision is made for a removal of the upper sash from the frame by means of pivots upon it, which will slide along transverse grooves in the pulley-stiles and so into vertical grooves cut in the sash.

7,824.—DRAIN-PIPE SOCKETS: *R. Stanley and R. H. Smith.*—For making the socketed ends of drain-pipes and similar plastic goods, the inventors contrive that the two halves of the socket-die of the pipe-making machine shall exert great pressure upon the material. In one form the two halves of the die (into which are screwed hard-metal tips) are set to slide upon parallel guides; the spaces between their ends are filled with wedges which, together with the die-halves, are operated at one and the same time with crank and link gearing, the pressure being exerted by means of blocks which are joined to a four-sided frame that is worked with a screw mechanism. In another shape the half-dies are caused to slide upon metal guides, and their lugs join them to levers that are worked with a hand-wheel, for which, however, other power may be substituted. At the ends of the shaft are right and left handed threads, and hollow blocks, having their inner surfaces rounded, are mounted upon the shaft.

7,833.—TRAVELLING CRANES: *F. W. Tannett-Walker.*—A carriage, on rails, having a horizontal pulley, and a crab, also on rails, traverse the traveller. A rope from the carriage passes around pulleys to the crab, then around the fall-block, and so to the crab again, and thence to a fixed point upon the traveller, whereby the lifting-hook will be lifted and dropped with the movement of the carriage. For working the carriage apart from the position of the traveller, another rope is passed from the fixed hydraulic cylinders round a pulley upon the traveller and so around pulleys upon the carriage and traveller to a fixed point. In a modified form of the apparatus the ends of cross-shafts have pulleys which run upon rails, and pulleys upon the cross-shafts carry the hauling-ropes for the traveller. Each of the shafts is disposed in the bight of the

rope, the ends of which are secured to the end wall and the traveller respectively, so that it will move at a speed one-half of that of the traveller.

7,845.—AN ODOMETER: *C. Y. Hopkins.*—An annular space for the numbered wheels is bored in the solid metal which forms the core and casing; upon a spindle are transmitting and locking pinions that fit into a recess in the core; the operating star-wheel has a spindle having an eccentrical enlargement which carries two differently pitched and rigidly joined pinions that engage with the teeth of a fixed ring and an outer ring; on the casing is mounted a cylindrical rib adjustably set in an eyed-plate with a fork clamped with a screw pin that engages with a gripping-piece.

7,847.—CONTRIVANCE FOR INCANDESCENT GAS LAMPS: *W. T. Sugg.*—The mantle-rod is truely mounted in a peg of pipeclay, which is cemented in a recessed stump that constitutes the centering; a cap bearing upon the shoulder of the centering-stump may be adopted instead of the peg.

7,851.—WIRING FOR INCANDESCENT ELECTRICAL LAMPS: *O. Riebensahm.*—The neck of the bulb is contracted, and tapered at the end. The bulb is fashioned with a tube that projects inwards, and in the inner end of which the leading-in wires are sealed, one of them being fastened in an insulating-plug, and the other being turned over and coiled upon the contracted part of the neck of the bulb. When the neck has been forced into the cap the tongues of a metal liner will be pressed against the coiled wire. A central contact and a spring that presses upon the other wire are mounted upon the insulating portion of the cap.

7,857.—A STEEL-YARD: *S. R. Fernandez.*—The steel-yard is intended for use with both heavy and light loads, for which the beam is graduated with lower and upper scales respectively. In the case of heavy loads an auxiliary weight is hung from a grooved sliding weight, and for weighing light loads the auxiliary weight is hung from the end of the beam.

7,870.—SIPHONICAL DISCHARGE: *C. Darrah.*—The inventor's object is to furnish means of lessening the noise of the discharge. He supplements the main siphon with a subsidiary one in order that air may gain entrance through an orifice in the leg of the latter siphon, as soon as the level shall have reached it. He also arranges a loosely-fitting float, which will slide over the orifice as it becomes uncovered.

7,904.—BALL-AND-FLOAT VALVES: *F. J. Brazier.*—The invention relates to an automatical valve for use with flushing-tanks, cisterns, &c. A sleeve carried upon connecting pieces is inserted within an extension, downwards, of the valve casing on which are lugs for the pivots of the float-lever that is inserted through a slot in an arm of the plug-valve. On the casing is a rim or seat, turned downwards, against which the valve works, and it also has stops for restricting the movement of the float-lever.

7,911.—A PRESERVATIVE FOR WOOD: *J. Rütgers.*—A solution that will form an emulsion with water, and for which highly penetrating qualities are claimed, consists of tar oil dissolved in acids that have been derived from resin oil after its treatment with concentrated sulphuric acid.

7,925.—PILE-DRIVERS FOR FOUNDATION WORKS: *A. Ducloux.*—A monkey having its end pointed is dropped into the soil, and when the hole has been filled with sand, &c., the process is repeated until the requisite amount of resistance results, then a monkey having a broad and flat end is dropped for rendering the ground smooth; the lifting-chain of the pile-driver is fastened to a pulley that hangs from a spring upon an adjustable carriage and is thence passed over the carriage and another pulley; for an automatical disengagement are devised three gripping-jaws that are pivotted upon spindles between lugs which hang by links and spindles, from the lower part of the hook, the monkey is liberated as it rises through the engagement of the upper parts of the jaws with their guide.

7,945.—CONSTRUCTION OF FLOORS: *A. Gray.*—For their protection against fire, slabs of earthenware, wired terra-cotta, metal lathing, non-inflammable wood, or some other fireproof substances, are fastened in position about the beams, joists, and girders, between the slabs and the beams, or above the covering slabs are affixed centering slabs of concrete, slate, plaster, and so on, which will sustain the concrete or similar pugging that has been filled in. The fire-proof slabs may be affixed with hanging wires and tubes, the latter being available for carrying gas pipes and electrical wires.

8,040.—TRESTLES, &C., FOR STAGING FOR USE BY PAINTERS, PLASTERERS, AND BUILDERS GENERALLY: *H. J. Williams and A. H. Williams.*—These are made up with bars and struts joined together with stays or tie-rods, hinge-plates, and bolts. Provision is made for their vertical adjustment by making several bolt-holes in each bar, and to the bars are attached stepped blocks that will carry a round put-log or pole, or a horizontal plank laid upon its edge. For the stepped blocks may be substituted slotted metal plates bolted on to the bars and rendered adjustable sideways. The struts are after the telescopical kind, the flooring-boards are to be laid either upon put-logs laid on the trestles or planks, or upon the planks laid on their edges.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 13.—By ALFRED J. BURROWS (at Ashford).

Little Chart, Kent.—Monday Boys, Rose and Crown b.-h., f.	£1,200
Ashford, Kent.—Bank-st., Ashford Post Office, u.t. 67 yrs., g.r. 9*l.*, r. 120*l.*	1,300

August 14.—By WRIGHT & SCRUBY (at March).

Wimblington, Cambs.—The Park and 25 a. 2 r. 10 p., f.	2,300
Enclosures of pasture and arable land, 128 a. 1 r. 8 p., f.	3,705
Two cottages and 1 a. 2 r. 12 p., f.	280
High-rd., The Manor House and 3 a. 2 r. 6 p., f.	490
Two enclosures of pasture land, 10 a. 3 r. 30 p., f.	245
The Home or Nix Hall Farm and enclosures, 158 a. 2 r. 38 p., f. and c.	5,495

August 15.—By WYATT & SON (at Selsey).

Selsey, Sussex.—West-st., freehold field, 2 a. 0 r. 26 p.	310

By W. H. SHINER & WINTER (at Bristol).

Wick St. Lawrence, Somerset.—Sluice Farm, 84 a., f.	4,975

August 16.—By WILLSON & PHILLIPS (at Leigh).

Leigh, Essex.—New-rd., seventeen cottages, f., r. 151*l.* 8s.	1,340
New-rd., f.g.r. 12*l.*, reversion in 59 yrs.	405

August 19.—By THOMAS, PEYER, & MILES.

Bramley, Surrey.—High-st., The Bramley Brewery, together with eight licensed houses and goodwill, f. and l.	16,250

By WRIFORD & DIXONS.

Maida Vale.—9, Clifton-villas, u.t. 40½ yrs., g.r. 6*l.*, e.r. 85*l.*	675

By WHEELER & SON (at Clare).

Pentlow, Essex.—Pannell's Ash and Simpson's Farms, 229 a. 2 r. 30 p., f.	2,540

August 20.—By HENRY EDWARDS (Imperial Land Company).

Kentish Town.—17, Mansfield-rd., u.t. 48 yrs., g.r. 6*l.* 10s., e.r. 55*l.*	670

By C. & H. WHITE.

Kennington.—17, Harleyford-st., u.t. 35 yrs., g.r. 5*l.*, r. 50*l.*	400

By T. NEALE & SON (at Nottingham).

Beeston, Notts.—Meadow-rd., Clifton House and piece of land adjoining, f.	1,650

By ALFRED PRESTON (at Ipswich).

Battisford, Suffolk.—The Valley Farm, 93 a. 3r. 23 p., f. and c.	700

By JOHN THORNBORROW (at Penrith).

Kirkoswald, Cumberland.—Parkhead Farm, 90 a. 2 r. 31 p., f. and c.	1,740

August 21.—By SLADE & BUTLER.

Battersea.—9 and 11, Orbel-st., u.t. 76 yrs., g.r. 12*l.* 12s., r. 78*l.*	600

August 22.—By ELDRIDGE, SONS, & CO.

Stroud Green.—6, Ferme Park-rd., u.t. 77 yrs., g.r. 14*l.*, r. 80*l.*	1,000

By FISHER, STANHOPE, & DRAKE.

Stoke Newington.—25, Forburg-rd., u.t. 85 yrs., g.r. 6*l.* 10s., e.r. 45*l.*	525
Finsbury Park.—442, Seven Sisters'-rd., u.t. 64 yrs., g.r. 14*l.*, e.r. 80*l.*	1,000

By WM. R. NICHOLAS & CO.

Cholsey, Berks.—Freehold residence and 3 a. 2 r. 9 p.	1,150

By NEWBON, EDWARDS, & SHEPHARD.

Islington.—75, 79, and 81, Pembroke-st., u.t. 48 yrs., g.r. 3*l.*, r. 145*l.*	1,020
Canonbury.—83, Petherton-rd., u.t. 48 yrs., g.r. 7*l.* 7s., e.r. 60*l.*	500
Harlesden.—47, Craven Park-rd., f., r. 45*l.*	565
Kentish Town.—10, Modbury-st., u.t. 48 yrs., g.r. 6*l.*, e.r. 34*l.*	255
Tottenham.—2 and 4, The Crescent, f., r. 48*l.* 2s.	480
10A, Brunswick-rd., f., r. 36*l.* 8s.	325
6, Highweek-rd., u.t. 78 yrs., g.r. 4*l.* 10s.	170
29 and 30, Nelson-rd., u.t. 78 yrs., g.r. 8*l.*	255
49 and 51, Avenue-rd., u.t. 65 yrs., g.r. 8*l.*	295
56, Avenue-rd., u.t. 76 yrs., g.r. 7*l.* 10s.	210
9 and 11, Richmond-rd., u.t. 73 yrs., g.r. 8*l.*	350
54 to 60 (even), Asplin's-rd., u.t. 78 yrs., g.r. 22*l.*	590
147, Northumberland Park, u.t. 50 yrs., g.r. 4*l.* 10s.	225
Edmonton.—53 to 59 (odd), Graham-rd., u.t. 78 yrs., g.r. 16*l.*	300

August 23.—By THE FREEHOLD LAND AND TRADING COMPANY, LIMITED.

Hanwell.—8, 9, 11, 12, 13, and 14, Holly Park-terrace, u.t. 95 yrs., g.r. 30*l.*, r. 174*l.*	1,845

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.		
Hard Stocks	1	14	0	per 1,000	alongside, in river.
Rough Stocks and Grizzles	1	11	6	"	" "
Facing Stocks	2	12	0	"	" "
Shippers	2	8	0	"	" "
Flettons	1	8	6	"	at railway depôt.
Red Wire Cuts	1	14	6	"	" "
Best Fareham Red	3	11	0	"	" "
Best Red pressed Ruabon Facing.	5	5	0	"	" "
Best Blue Pressed Staffordshire	4	4	6	"	" "
Do., Bullnose	4	9	0	"	" "
Best Stourbridge Fire Bricks	4	2	6	"	" "

PRICES CURRENT (*Continued*).

	£	s.	d.		
GLAZED BRICKS					
Best White and Ivory Glazed Stretchers	13	0	0	per 1,000	at railway depot.
Headers	12	0	0	"	" "
Quoins, Bullnose, and Flats	17	0	0	"	" "
Double Stretchers	19	0	0	"	" "
Double Headers	16	0	0	"	" "
One Side and two Ends	19	0	0	"	" "
Two Sides and one End	20	0	0	"	" "
Splays, Chamfered, Squints	20	0	0	"	" "
Best Dipped Salt Glazed Stretchers and Headers	12	0	0	"	" "
Quoins, Bullnose, and Flats	14	0	0	"	" "
Double Stretchers	15	0	0	"	" "
Double Headers	14	0	0	"	" "
One Side and two Ends	15	0	0	"	" "
Two Sides and one End	15	0	0	"	" "
plays, Chamfered, Squints	14	0	0	"	" "
Seconds Quality White and Dipped Salt Glazed	2	0	0	"	less than best.

	s.	d.	
Thames and Pit Sand	7	3	per yard, delivered.
Thames Ballast	6	0	" "
Best Portland Cement	34	6	per ton, delivered.
Best Ground Blue Lias Lime	25	6	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s 6d.	per yard, delivered.
Stourbridge Fire-clay in sacks, 28s. od.		per ton at rly. dpt

STONE.

	s.	d.	
Ancaster in blocks	2	0	per ft. cube, deld. rly. depôt.
Bath "	1	7	" "
Farleigh Down Bath	1	8	" "
Beer in blocks	1	6½	" "
Grinshill "	1	10	" "
Brown Portland in blocks	2	2	" "
Darley Dale in blocks	2	1½	" "
Red Corsehill "	2	5	" "
Red Mansfield "	2	4½	" "
Hard York in blocks	2	10	" "
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2	8	per ft. super at rly. depôt
" " 6 in. Rubbed Ditto	3	0	" "
" " 3 in. sawn both sides slabs (random sizes)	1	3	" "
" " 2 in. self-faced Ditto	0	9½	" "
Hopton Wood (Hard Bed) in blocks	2	3	per ft. cube. deld. rly. depôt
" " " 6-in sawn both sides landings	2	7	per ft. super. deld. rly. depôt.
" " " 3-in. do.	1	2½	" "

SLATES.

in.	in.	£	s.	d.	
20×10	best blue Bangor	11	5	0	per 1000 of 1200 at rly. dep.
"	best seconds "	10	15	0	" "
16× 8	best "	6	2	6	" "
20×10	best blue Portmadoc	10	18	0	" "
16× 8	best blue Portmadoc	6	0	0	" "
20×10	best Eureka unfading green	11	2	6	" "
16× 8	" "	6	15	0	" "
20×10	Permanent green	10	0	0	" "
16× 8	" "	5	12	6	" "

TILES.

	s.	d.	
Best plain red roofing tiles	41	6	per 1,000 at rly. depôt
Hip and valley tiles	3	7	per doz. " "
Best Broseley tiles	48	6	per 1,000 " "
Hip and valley tiles	4	0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000 " "
Do. ornamental Do.	60	0	" " "
Hip tiles	4	0	per doz. " "
Valley tiles	3	9	" " "
Best Red or Mottled Staffordshire Do. (Peakes)	50	9	per 1,000 " "
Hip tiles	4	1	per doz. " "
Valley tiles	3	8	" " "

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14	10	0	16	10	0
Deals: best 3 by 9	13	10	0	14	10	0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	11	0	0	12	0	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals seconds	1	0	0	less than best		
Battens: seconds	0	10	0	" "	"	
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	10	10	0
2 in. by 4½ in. and 2 in. by 5 in.	9	0	0	10	0	0
Foreign Sawn Boards— 1 in. by 1½ in. by 1½ in.	0	10	0	more than battens.		
¾ in.	1	0	0	more than battens.		
Fir timber: Best middling Dansig or Memel (average specification)	At per load of 50 ft. 4	10	0	5	0	0
Seconds	4	5	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Swedish balks	2	15	0	3	0	0
Pitch pine timber (35 ft. average)	3	0	0	3	10	

[*See also next page.*

CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Paving Works, &c., Church-street	Uckfield (Sussex) U.D.C.	C. Dawson, Public Hall Chambers, Uckfield	Sept. 3
Sewerage Works, &c., Pembury	Tonbridge (Kent) R.D.C.	W. V. Graham, Civil Engineer, 5, Queen Anne's Gate, S.W.	do.
Fifteen Houses, Almondbury, Yorks		J. Berry, Architect, 9, Queen-street, Huddersfield	do.
Cast-iron Pipes, &c., Lavernock	Llandaff & Dinas Powis R.D.C.	J. Holden, Surveyor, 35, St. Mary-street, Cardiff	do.
Concrete Walling, &c., Andrew's-road	Hackney Borough Council	N. Scorgie, Civil Engineer, Town Hall, Hackney, N.E.	do.
House, Caeran, Cardiff	Col. Sir E. S. Hill	J. W. Rodger, Architect, 14, High-street, Cardiff	do.
Buildings at School of Art, Leeds	Committee	Bedford & Kitson, Architects, Greek-street Chambers, Leeds	do.
Additions, &c., to Cottages, Talywain		J. D. Jones, 1, Emlyn-terrace, Talywain, Wales	do.
Several Cottages, Troedyrhiw, Wales	Brynhyfryd Building Club	W. Dowdeswell, Architect, Treharris, S. Wales	do.
Additions to Church, Linthwaite, near Huddersfield		Boreham & Morton, Surveyors, 24, John-street, Sunderland	Sept. 4
Additions to Workhouse	Toxteth Park (Liverpool) Gdns.	W. W. Thomas, Architect, 15, Lord-street, Liverpool	do.
Council Offices, Liverpool-road	Walmer U.D.C.	R. A. Wilson, Surveyor, Council Offices, Walmer	do.
Tar Paving, &c., Chapman-road	Clacton-on-Sea U.D.C.	A. R. Robinson, Surveyor, Clacton	do.
Chapel, Blaengarw, Glam.		Dr. J. L. Thomas, Blaengarw	do.
Intake Works, Carbis	St. Austell R.D.C.	T. H. Andrew, Engineer, 1, Trevarrick-villas, St. Austell	do.
House, Wellesley-road, Great Yarmouth	Mr. H. R. Atkins	C. G. Baker, Architect, Town Hall Chambers, Great Yarmouth	do.
Retort Works, &c.	Ellesmere (Salop) U.D.C.	R. E. Lloyd, 1, Willow-street, Ellesmere	do.
Additions to Home, Murthly Asylum		D. Smart, Architect, Perth	Sept. 5
Additions to Houses, Ingleton	Mr. N. Saul	J. Kassell, Architect, Kirkby Lonsdale	do.
Wood Paving	Chatham Corporation	C. Day, Borough Surveyor, Town Hall, Chatham	do.
Additions to the Shepherds' Arms, Cwmaman	Mr. E. Evans Bevan	J. C. Rees, Architect, Neath	do.
Boundary Walls, &c., Brownhill, Dewsbury		Holtom & Fox, Architects, Dewsbury	Sept. 6
Additions to Infirmary, Bristol		A. P. T. Cotterell, Architect, 28, Baldwin-street, Bristol	do.
House, Moat-road, Great Yarmouth		S. Rivett, Architect, 5, South Quay, Great Yarmouth	do.
Seven Houses, Old Penshaw, Durham	Mr. R. W. Wilson	Mr. Wilson, Shiney-row, Old Penshaw, Durham	do.
Alterations to Laundry, &c., Preston		F. E. Dixon, Civil Engineer, 49, Lune-street, Preston	Sept. 7
Slaughter Houses, &c., Bath-street	Rugby U.D.C.	D. G. Macdonald, Civil Engineer, Rugby	do.
Rebuilding Cashen Ferry Bridge, Tralee		S. Goodwin, Surveyor, Tralee, co. Kerry	do.
School and Boundary Wall, Banbridge, Ireland	Select Vestry	T. Larmour, Dromore-street, Banbridge	do.
Schools, Windsor-road, Great Harwood, Lancs		W. H. Dinsley, Architect, Cleveland-street, Chorley	do.
Additions to the Panteg Hotel, Aber, Wales		A. O. Evans, Architect, Pontypridd	do.
Well Adit	Beaminster R.D.C.	H. Gordon, Engineer, 9, Downes-street, Bridport, Dorset	Sep. 9
Chapel	Southborough, Kent, U.D.C.	W. Harmer, Surveyor, 137, London-road, Southborough	do.
Sea Wall	Penmaenmawr (N. Wales) U.D.C	E. Worrall, Engineer, Council Offices, Penmaenmawr	do.
Road Works, &c., Dale-road	Rawmarsh U.D.C.	Surveyor, Council Offices, Rawmarsh	do.
Pumping Machinery	Cowes U.D.C.	J. W. Webster, Engineer, Cowes, Isle of Wight.	do.
Additions to Wesleyan Chapel, Cwmavon		G. E. Prosser, Cwmavon	do.
Baths	Aberdare U.D.C.	T. Phillips, Surveyor, Town Hall, Aberdare	do.
Wrought-iron Fencing	do.	do.	do.
Retaining Walls, &c., Clayton Vale	Manchester Corporation	City Surveyor, Town Hall, Manchester	do.
*Stoneware Pipes	Edmonton U.D.C.	G. Eedes Eachus, Town Hall, Edmonton	Sept. 10
*Portland Cement	do.	do.	do.
*Broken Granite	do.	do.	do.
Abattoirs	Lincoln Corporation	R. A. Macbrair, Surveyor, Corporation Offices, Lincoln	do.
Two Bridges, Briton Ferry, &c.	Great Western Railway Company.	G. K. Mills, Paddington Station, W.	do.
Bridge Works, Oxcliffe Marsh, Lancs	Lancashire County Council	Lancashire County, Bridgemaster, Preston	do.
Bridge Works, Alverston	do.	do.	do.
Rebuilding Holt Bridge, Rawtenstall	do.	Bridgemaster, County Offices, Preston	do.
*Wrought-iron Fencing, &c.	Woolwich Union	Church, Quick, & Whincop, William-street, Woolwich	Sept. 11
*Drainage and Sanitary Works, Brentwood Schools	Hackney Union	W. A. Finch, Architect, 76, Finsbury-pavement, E.C.	do.
*Well-sinking Works, Quadrant, Pumps, &c.	Croydon County Borough	Borough Engineer, Town Hall, Croydon	do.
*Enlargement of Iron Building	Plumstead Congregational Church	Viewland-road, Riverdale-road, E. Plumstead	do.
*Erection of Shed	Lewisham Council	Surveyor, Town Hall, Catford	Sept. 12
*Erection of Cottage	do.	do.	do.
*Construction of Sewer	do.	do	do.
*Extensions, &c., to Asylum, Aylesbury	Bucks County Lunatic Asylum	County Surveyor, County Hall, Aylesbury	do.
Water Supply Works	Llandudno U.D.C.	E. P. Stephenson, Engineer, Council Offices, Llandudno	Sept. 14
*Road Works	Hanwell U.D.C.	S. W. Barnes, Council Offices, Church-road West, Hanwell W.	Sept. 16
*Laundry, Boiler House, E. L. Engine Room, &c.	West Riding County Council	The County Surveyor, Wakefield	do.
*New Harbour Offices	Swansea Harbour Trust	Harbour Offices, Swansea	Sept. 18
*Casual Wards, Gray's Inn-road	Holborn Union	W. Mellor, 17, Buckingham-street, Adelphi, W.C.	do.
Schools, Burry Port, Wales	Pembrey School Board	R. Williams, Architect, Burry Port	Sept. 26
*Isolation Hospital	Longton Corporation	Town Clerk, Court House, Longton	No date
Laundry, Witton Tower, Witton-le-Wear, co. Durham	Co-operative Society	S. Wilkinson, Architect, Pelton, Chester-le-Street.	do.
Stabling, &c., Dorning-street, Wigan	Mr. R. D. Shafte	J. B. & W. Thornley, Architects, Millgate, Wigan	do.
Farmhouse, Usworth, co. Durham		S. Wilkinson, Architect, Pelton, Chester-le-Street	do.
Additions to Schools, Trefonen, near Oswestry	Mrs. Irvine	F. H. Shaylar, Architect, 19, Church-street, Oswestry	do.
Eight Shops, Willesden		J. Minnis, 25, Lonsdale-road, Barnes	do.
Cottage, Buxton		Garlick & Flint, Architects, Buxton	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Assistant Examiner in Patent Office	Civil Service Commission	Not stated	Sept. 19
*Clerk of Works	Carlisle, &c., Co-op. Society, Ltd.	Not stated	Sept. 21
*Clerk of Works	Midland Counties Idiot Asylum	Not stated	No date

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. —. Contracts, pp. iv. vi. viii. x. & xxi. Public Appointments, pp. xix. & xxi.*

PRICES CURRENT (*Continued*).
WOOD.

Joiners' Wood.	At per standard. £ s. d.	£ s. d.
White Sea: First yellow deals, 3 in. by 11 in.	25 0 0	26 0 0
3 in. by 9 in.	22 0 0	23 0 0
Battens, 2½ in. and 3 in. by 7 in.	18 0 0	20 0 0
Second yellow deals, 3 in. by 11 in.	20 0 0	21 0 0
,, ,, 3 in. by 9 in.	18 0 0	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	14 0 0	15 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	14 10 0	15 10 0
Battens, 2½ in. and 3 in. by 7 in.	12 0 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	22 0 0	23 0 0
Do. 3 in. by 9 in.	19 0 0	20 0 0
Battens	14 0 0	15 0 0

PRICES CURRENT (*Continued*).
WOOD.

Joiners' Wood.	At per standard. £ s. d.	£ s. d.
Petersburg: second yellow deals, 3 in. by 11 in.	15 10 0	16 10 0
Do. 3 in. by 9 in.	14 0 0	15 0 0
Battens	11 10 0	12 0 0
Third yellow deals, 3 in. by 11 in.	13 10 0	14 10 0
Do. 3 in. by 9 in.	13 0 0	13 10 0
Battens	10 10 0	11 10 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	15 0 0	16 0 0
,, ,, ,, 3 in. by 9 in.	14 0 0	15 0 0
Battens	12 0 0	13 0 0
Second white deals 3 in. by 11 in.	14 0 0	15 0 0
,, ,, ,, 3 in. by 9 in.	13 0 0	14 0 0
,, ,, battens	10 10 0	11 10 0

PRICES CURRENT (*Continued*).
WOOD.

Joiners' Wood.	At per standard. £ s. d.	£ s. d.
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—		
First, regular sizes	30 0 0	33 0 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 3 0
Small ,, ,,	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 7
in. do. do.	0 0 7	- - -

PRICES CURRENT (*Continued*).

WOOD.

	At per standard. £ s. d.	£ s. d.
Dry Mahogany—		
Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—		
Per ft. cube	0 3 0	0 3 6
Prepared Flooring—	Per square	
1 in. by 6 in. and 7 in. yellow, planed and shot	0 13 0	0 16 6
1 in. by 6 in. and 7 in. yellow, planed and matched	0 13 6	0 17 6
1¼ in. by 6 in. and 7 in. yellow, planed and matched	0 16 0	1 1 0
1 in. by 6 in. and 7 in. white, planed and shot	0 11 0	0 13 0
1 in. by 6 in. and 7 in. white, planed and matched	0 11 6	0 13 6
1¼ in. by 6 in. and 7 in. white, planed and matched	0 14 0	0 16 6

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 15 0	7 15 0
Compound Girders " "	8 15 0	10 0 0
Angles, Tees and Channels, ordinary sections	8 12 6	10 12 6
Flitch Plates	8 15 0	9 10 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 5 0	9 0 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON.—		
Common Bars	8 0 0	8 10 0
Staffordshire Crown Bars, good merchant quality	8 10 0	9 0 0
Staffordshire "Marked Bars"	10 10 0	- - -
Mild Steel Bars	9 0 0	9 10 0
Hoop Iron, basis price	9 5 0	9 15 0
" " galvanised	16 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	10 0 0	- - -
" " to 24 g.	11 0 0	- - -
" " to 26 g.	12 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	12 10 0	- - -
" " 22 g. and 24 g.	13 0 0	- - -
" " 26 g.	14 0 0	- - -
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	16 10 0	- - -
" " 22 g. and 24 g.	17 0 0	- - -
" " 26 g.	18 10 0	- - -
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 10 0	- - -
" " 22 g. and 24 g.	13 0 0	- - -
" " 26 g.	14 0 0	- - -
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 5 0	- - -
" " 22 g. and 24 g.	13 5 0	- - -
" " 26 g.	14 5 0	- - -
Cut nails, 3 in. to 6 in.	9 10 0	10 0 0
(Under 3 in. usual trade extras.)		

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	14 17 6	- - -
Pipe in coils	15 7 6	- - -
Soil Pipe	17 17 6	- - -
ZINC—Sheet—		
Vieille Montagne ton	24 10 0	- - -
Silesian	24 0 0	- - -
COPPER—		
Strong Sheet per lb.	0 1 0½	- - -
Thin "	0 1 2	- - -
Copper nails "	0 1 2	- - -
BRASS—		
Strong Sheet "	0 0 11	- - -
Thin "	0 1 1	- - -
TIN—English Ingots "	0 1 4½	- - -
SOLDER—Plumbers' "	0 0 7	- - -
Tinmen's "	0 0 8	- - -
Blowpipe "	0 0 9	- - -

PLASTER, &c.

	s. d.	
Coarse Plaster	30 0	per ton delivered.
Fine "	38 0	" "
Coarse Keenes and Parian cement	55 0	" "
Fine do. do.	60 0	" "
Robinson's Fireproof Cement	50 0	" "
Do. Fine white "	55 0	" "
(Exclusive of the ordinary charge for sacks.		
Whiting	27 0 to 30 0	" "

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	3d. per ft. delivered.
" " fourths	2¾d. " "
21 oz. thirds	3½d. " "
" " fourths	3¾d. " "
26 oz. thirds	5d. " "
" " fourths	4½d. " "
32 oz. thirds	6d. " "
" " fourths	5½d. " "
Fluted sheet, 15 oz.	3½d. " "
" " 21 "	4½d. " "
½ Hartley's Rolled Plate	3d. " "
⅝ " " "	3½d. " "
¾ " " "	4d. " "

PRICES CURRENT (*Continued*).

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 2 10
" " " in barrels "	0 2 11
" " " in drums "	0 3 1
Boiled " " in pipes "	0 3 0
" " " in barrels "	0 3 1
" " " in drums "	0 3 3
Turpentine, in barrels "	0 2 3
" in drums "	0 2 5
Genuine Ground English White Lead per ton	22 0 0
Red Lead, Dry "	22 10 0
Best Linseed Oil Putty per cwt.	0 9 0
Stockholm Tar per barrel	1 10 0

VARNISHES, &c.

	per gallon £ s. d
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 6
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 0
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 9 0
Berlin Black	0 15 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

J. S. & Sons (Amounts should have been stated).

A. R. B. (As you do not send your name, we are not able to print your communication).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

ABERDEEN.—For the construction of outfall sewerage works, for the Town Council. Mr. W. Dyack, C.E., Town House, Aberdeen:—

Peter Tawse, Portland-street, Aberdeen* £54,949 8 2

ASTON ABBOTTS (Bucks).—For the erection of a pair of cottages, for Mr. Edward Hart. Mr. Fred Taylor, architect, Aylesbury:—

Thos. J. N. Cannon £509

AXMINSTER.—Lower Westwater farm buildings, for Mr. J. Dominett. Mr. Ernest A. Pryer, architect and quantity surveyor:—

Ellis & Sons £575	Parsons & Clarke £479
G. H. Lentell 487	

AXMINSTER.—Middle Westwater residence, for Dr. Dunstan, of London. Mr. Ernest A. Pryer, architect and quantity surveyor, Dunheved Chambers, Axminster:—

C. Turner £1,400	Ellis & Sons £1,080
Hobbs & Son 1,338	G. H. Lentell 1,073
Clarke & Parsons 1,246	

AYLESBURY.—For the erection of a detached residence in the Wendover-road, for Mr. J. Kingham. Mr. Fred Taylor, architect, Aylesbury:—

Webster & Cannon £820	J. Holland £811
Green & Co. 820	Mayne & Son† 780

BRILL.—For additions to the National Schools at Oakley, for the Brill School Managers. Mr. Fred. Taylor, architect, Aylesbury:—

J. Holland £227

CHEARSLEY (Bucks).—For additions to house at Chearsley, for Mr. F. T. Higgins Bernard. Mr. Fred. Taylor, architect, Aylesbury. Quantities by the architect:—

T. H. Kingerlee & Sons £2,027	Webster & Cannon £1,725
G. H. Gibson 1,850	Green & Co.* 1,642

CROYDON.—Two shop premises at corner of Tamworth-place, Church-street, Croydon. Mr. A. Broad, architect, 22, George-street, Croydon. Quantities by the architect:—

Huntley Bros. £2,710	D. W. Barker £2,168
S. Page 2,664	Smith & Son 2,158
Akers & Co. 2,375	E. J. Saunders 2,140
Smith & Sons 2,200	Pearson & Co.* 1,850
W. Potter 2,180	

CROYDON.—Four cottages, Newark-road. Mr. A. Broad, architect, 22, George-street, Croydon:—

J. J. Cooper £1,765	W. Potter* £1,300
Pearson & Co. 1,437	

GREENOCK.—For the extension of the engine-room at electricity station, Hunter-street, for the Police Board. Mr. W. M. Nelson, Burgh Engineer, Hunter-place, Greenock:—

Aitkenhead & Sons, Greenock* £1,175 18 10

HARROGATE.—For the erection of a police convalescent home. Messrs. Chorley, Connon, & Chorley, architects, 15, Park-row, Leeds:—

Anthony Lyons £8,827 0 0	J. T. Wright £8,150 10 0
Wm. Nicholson & Sons 8,175 0 0	R. Airton, Harrogate* 7,600 10 0

HEREFORD.—For the erection of six cottages at Asylum, Burghill, for the Visitors. Mr. A. Dryland, County Surveyor, Shire Hall, Hereford. Quantities by the architect:—

Lewis & Co. £2,415	J. Davies £2,276
Wm. Powell 2,375	E. W. Wilks* 2,116
C. Cooke 2,300	

[All of Hereford.]

LONDON.—For alterations and additions at No. 101, Great Titchfield-street, W., for Mr. William Matthews. Messrs. H. Fuller Clark & Percy A. Boulting, architects, 28, John-street, Bedford-row, W.C.:—

Patman & Fotheringham £3,700	Saunders & Co. £2,380
Clarke & Mannoch 2,497	A. A. Webber 2,333
J. Hughes 2,408	Burman & Sons 2,064
Perkins & Co. 2,395	Anley & Son 1,920
	Pitcher & Son* 1,904

LONDON.—For alterations at No. 66, Berners-street, W. Messrs. H. Fuller Clark & Percy A. Boulting, architects, 28, John-street, Bedford-row, W.C.:—

Bruton & Son £445	Anley & Son £310
Boulting & Sons 390	Pitcher & Son 294

LONDON.—For re-pointing, painting, and general repairs to 101 and 102, Chalton-street, for Messrs. Connolly Bros. Mr. Edwin G. Salter, architect and surveyor, 13, Phœnix-street, St. Pancras, N.W.:—

T. G. Sharpington £520 0	W. J. Clarke £423 0
Marchant & Hirst 493 0	Vears & Co. 419 0
Fowler Bros. 487 10	Wm. Hunnings, Holloway* 415 0
H. M. Dove 450 0	

LONDON.—For office fittings, &c., at 19, Cousin-lane, Cannon-street, E.C., for the Ceylon, India, and China Tea Association. Mr. Chas. G. Miller, architect, 65, Chancery-lane, W.C.:—

A. & A. Webber £634	Parker £540
Richards & Co. 596	Parnall & Co., Ltd., Rood-lane* 530
Sheffield 573	

LONDON.—For painting, whitewashing, and repairs, &c., at the workhouse and infirmary, Fulham Palace-road, Hammersmith, W., for the Guardians of the Poor of Fulham Parish:—

J. Halse £1,645	J. J. Richards £792
W. J. Renshaw 1,497	G. McArthur, Fulham* 760
T. Bendon 1,050	E. Mills 743
Vigor & Co. 860	

LONDON.—For alterations and additions to the workhouse, Fulham Palace-road, Hammersmith, W., for the Guardians of the Poor of Fulham parish:—

H. C. Clifton £4,210	T. Bendon, Hammersmith* £2,522
Martin, Wells, & Co. 3,694	
F. G. Minter 3,041	

LONDON.—For the erection of cottage homes for the aged poor, at Tooting Home, Church-lane, Tooting, for Wandsworth and Clapham Guardians. Mr. Cecil A. Sharp, architect, 11, Old Queen-street, Queen Anne's-gate, S.W.:—

Herbert Bros. £4,437 0 0	Smith & Son £3,950 0 0
Harvey, Coney, & Co. 4,329 0 0	Hobbs & Co. 3,888 0 9
R. A. Jewell 4,212 0 0	Canning & Mullins 3,800 0 0
Martin, Wells, & Co. 4,197 0 0	H. Clark 3,782 0 0
W. Dowland 4,148 0 0	Huntley Bros., Croydon* 3,629 0 0
Foster Bros. 4,039 0 0	

NEWTON ABBOT.—For the erection and completion of isolation hospital for the joint committee. Mr. Wm. Rowell, architect, Newton Abbot. Quantities by Mr. Vincent Cattermole Brown, Paignton:—

W. E. Blake £7,324	Parker Bros. £5,894
Mingo & Boone 6,785	H. Mills 5 589
F. A. Stacey 6,557	I. Edwards, Newton Abbot† 5,225
Yeo & Sons 6,000	
G. Hicks 5,998	

NORTON (Yorkshire).—For the erection of semi-detached villas, Langton-road, for Mr. T. Lofthouse. Mr. H. Ascough Chapman, architect, Leeds and Scarborough:—

Anthony Lyons £1,828 10

NORTON (Yorkshire).—For the erection of a detached house, St. Peter's-street and Langton-road. Mr. H. Ascough Chapman, architect, Leeds and Scarborough:—

Anthony Lyons £1,312

ORPINGTON (Kent).—For additions and alterations to a private residence at Orpington. Mr. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C., and Orpington:—

Stebbings & Pannett £258 0	E. R. Thorne £240 10
Somerford & Son 244 0	W. Owen* 240 0

[*See also next page.*

ORPINGTON (Kent).—For repairs to private residence. Mr. St. Pierre Harris, architect, 8, Ironmonger-lane. E.C. :—

W. R. Taylor	£267	Somerford & Son*	£159
R. A. Lowe	225		

PEMBROKE DOCK.—For the erection of two-storied schools, Meyrick-street, for the School Board. Messrs. G. Morgan & Son, architects, 24, King-street, Carmarthen :—

Thomas & Son	£10,552	Charles Young, Pembroke Dock*	£8,727
Davies & Morgan	9,703		
Davies & Griffiths	9,281		

REDRUTH.—For the erection of offices and stores, for Messrs. S. & T. Trounson. Mr. Sampson Hill, architect, Green-lane, Redruth :—

T. Martin and S. Head, Redruth* £1,655

REIGATE.—For the erection of an addition to Eastnor Lodge, Reigate, for Mr. Edgar Sharpe. Mr. C. E. Salmon, architect, Bell-street, Reigate :—

R. Killick	£1,140	Bagaley & Sons	£798
Nightingale & Sons	878	G. Martin, Redhill*	730

Plumbing.

Tamplin & Makooskis, Limited* £77 19 6

ST. MARY CRAY (Kent).—For a new iron schoolroom at Hockenden. Mr. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C. :—

	For the iron building.	For foundations and general work.
R. A. Lowe	£450	£619
Somerford & Son	—	556
Stebbings & Pannett	—	355
Humphreys, Ltd.	310	—
W. Harbrow	303	—
Smith & Co.	298	—

ST. PAUL'S CRAY (Kent).—For additions to private residence. Mr. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C., and Orpington :—

James Smith	£203	G. H. Lay	£180
E. R. Thorne	185	T. Knight	138
T. D. Gratz	185	Stebbings & Pannett*	137

ST. PAUL'S CRAY (Kent).—For additions and alterations to the Cray Valley Cottage Hospital. Mr. St. Pierre Harris, architect, Ironmonger-lane, E.C., and Orpington. Quantities by Messrs. Stanger & Son :—

G. Newton	£2,843	Somerford & Son	£2,649
Rider & Son	2,810	T. Knight	2,631
Stebbings & Pannett	2,805	T. D. Graty	2,537
Garrett & Son	2,749		

SOUTHALL.—For the erection of new factory for Messrs. Sanders & Son, Limited. Mr. Chas. G. Miller, architect, Southall and 65, Chancery-lane, W.C. :—

Richards & Co.* £3,995

SOUTHALL.—For the erection of mission buildings for the Vicar of St. John's Church, Southall. Mr. Chas. G. Miller, architect, Southall and 65, Chancery-lane, W.C. :—

G. H. Lough, Southall* £1,260

WATFORD.—For the execution of sewerage works, Aldenham, for the Rural District Council. Mr. Ernest Lailey, engineer, 9, Market-street, Watford :—

Hawkins & Co.	£1,010 19 6	R. G. Mann	£769 0 0
A. Green	939 7 6	R. L. Tonge	760 0 0
G. G. Rayner	909 0 0	Bracey & Clark	720 0 0
R. W. Swaker	855 0 0	H. Brown, Watford*	703 0 0
G. Pitkin	796 17 11		

[Engineer's estimate £720.]

WEALDSTONE.—For the execution of road works, Marlborough-road, for the Urban District Council. Mr. F. Hill Parr, C.E., Council Offices, Wealdstone :—

	Proposed Cemetery.	Marlborough-road.
R. Ballard, Ltd.	£1,935 11 0	£1,152 5 0
Meston & Hale	1,921 17 6	1,347 11 6
Neave & Son	1,719 3 8	1,281 17 9
E. W. Hollingsworth*	1,674 6 1	1,151 8 7*
Thos. Adams	1,645 12 4	1,201 0 0
W. Mann	1,488 0 0	1,281 16 4
Geo. Wilson*	1,388 0 0*	1,147 0 0
Surveyor's estimate	1,526 4 10	1,187 10 0

WEST DEREHAM.—For work at the partial restoration of West Dereham Church, Norfolk. Mr. Herbert J. Green, architect and surveyor, 31, Castle Meadow, Norwich :—

Bardell Bros.	£790 0 0	Tash, Langley, & Co., King's Langley†	£492 7 9
J. Boddy	585 0 0		
W. H. Brown	540 0 0	C. Fryer	475 10 0
J. W. Collins	493 0 0		

WEST GRIMSBY.—For the erection of a warehouse, for Mr. G. Shoesmith. Messrs. Rope & Jackson, architects, Victoria-street, Grimsby. Quantities by architects :—

Lambert & Smith	£1,396 0 0	Thomas	£752 3 2
J. & G. Smith	808 0 0	West	737 0 0
C. W. Dixon	800 0 0	Marrows	769 11 0
Sime	787 16 3	Lewis	723 17 11
Gilbert & Kirton	776 16 2	Wilkinson & Houghton, Daubney-street*	710 0 0
Hewins & Goodbond	768 0 0		

[All of Grimsby.]

WOOLSTON (Hants).—For the erection of a police station. Mr. W. J. Taylor, surveyor, The Castle, Winchester. Quantities by surveyor :—

Patricks & Co.	£6,900 0 0	Dyer & Sons	£5,000 0 0
H. Avery	6,432 10 8	Stevens & Co. Southampton*	4,756 0 0
Hinton Bros.	5 918 2 0		
Bagshaw & Sons	5,300 0 0		

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum (52 numbers) PREPAID. To all part of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to DOUGLAS FOURDRINIER) should be addressed to the publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder," by *Friday Morning's Post.*

J. J. ETRIDGE, Jr.

SLATE MERCHANT,

SLATER and TILER.

Penrhyn - Bangor,
Oakeley - Portmadoc,

And every other description of Slates, except American, Ready for immediate delivery to any Railway Station.

PLASTERERS' LATHS
(HAND-MADE)
ALWAYS IN STOCK.

Applications for Prices, &c., to
BETHNAL GREEN SLATE WORKS,
BETHNAL GREEN, LONDON, E.

C. B. N. SNEWIN & SONS, Ld.

MAHOGANY, WAINSCOT, WALNUT,
TEAK, VENEER, and TIMBER MERCHANT,

Nos. 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, & 17, BACK HILL, HATTON GARDEN, and 29, 30, & 31, RAY STREET, FARRINGDON ROAD, E.C.

THE LARGEST STOCK OF ALL KINDS OF WOODS IN EVERY THICKNESS, DRY, AND FIT FOR IMMEDIATE USE.
Telephone, No. 274 Holborn. Tele. Address: "SNEWIN, London."

THE BATH STONE FIRMS, Ltd.
BATH.
FOR ALL THE PROVED KINDS OF
BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Doulting Stone Co.
(incorporating the Ham Hill Stone Co. and C. Trask & Son The Doulting Stone Co.)
Chief Office :—Norton, Stoke-under-Ham, Somerset.
London Agent :—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co.

SPRAGUE & CO., Ltd.,
PROCESS BLOCK MAKERS
of all descriptions.
4 & 5, East Harding-street, Fetter-lane, E.C.

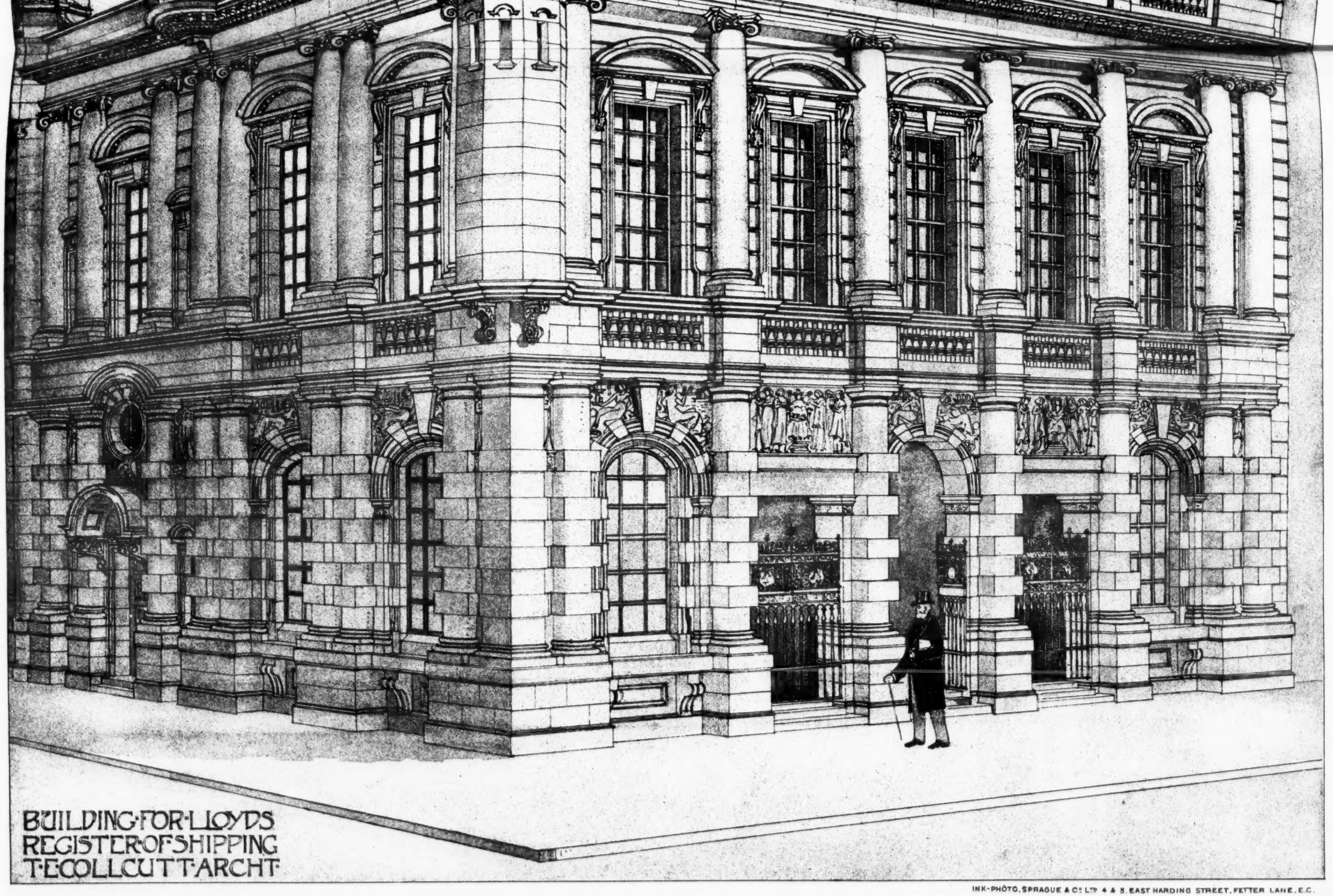
QUANTITIES, &c., LITHOGRAPHED accurately and with despatch. [Telephone No. 434 Westminster.
METCHIM & SON { 8, PRINCES STREET, GT. GEORGE ST. WESTMINSTER
"QUANTITY SURVEYORS' DIARY AND TABLES," For 1901, price 6d. post 7d. In leather 1/- Post 1/1.

DRY PLANKS AND BOARDS
In all kinds of Hard Woods.
Mahogany, Wainscot, Teak, &c. &c.
Wm. MALLINSON & Co.
Offices: 186 & 188, Hackney Road, London, N.E.
Telephone: 1319 AVENUE.

ASPHALTE
For Horizontal & Vertical Damp Courses.
For Flat Roofs, Basements, & other Floors.

Special attention is given to the above by
THE
French Asphalte Co.
Contractors to
H.M. Office of Works, The School Board for London, &c
For estimates, quotations, and all information, apply at the Offices of the Company,
5, LAURENCE POUNTNEY HILL,
CANNON STREET, E.C.

TWELVE GOLD AND SILVER MEDALS AWARDED.
IRON CISTERNS.
F. BRABY & CO.
VERY PROMPT SUPPLY.
LARGE STOCK READY.
Particulars on application. **CYLINDERS FOR HOT-WATER CIRCULATION.**
LONDON: 352 to 364, EUSTON-ROAD, N.W., and 218 and 220, HIGH-STREET, BOROUGH, S.E.
LIVERPOOL: 6 and 8, HATTON GARDEN.
GLASGOW: 47 and 49, ST. ENOCH-SQUARE.
BRISTOL: ASHTON GATE WORKS, CORONATION-RD.



INK-PHOTO, SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

LLOYDS REGISTRY OF SHIPPING, FENCHURCH STREET.—Mr. T. E. Collcutt, F.R.I.B.A., Architect.

DETAIL OF CROWNING CORNICE (WOOD).

LEAD

2'1"

11"

BRICK FACE

THE MAIN ROOF IS COVERED WITH TILES: THE TWO PEDIMENTS WITH LEAD

STONE QUOINS.

WINDOW HEADS.

DETAILS OF WINDOW HEADS AND JAMBS SHEWING PROFILES OF CONSOLES AND KEY STONES

IRON CASEMENT

JAMBS.

WINDOW CILL

SCALE OF INCHES FOR ALL DETAILS EXCEPT SWAGS:

ELEVATION OF CENTRAL BAY OF PR

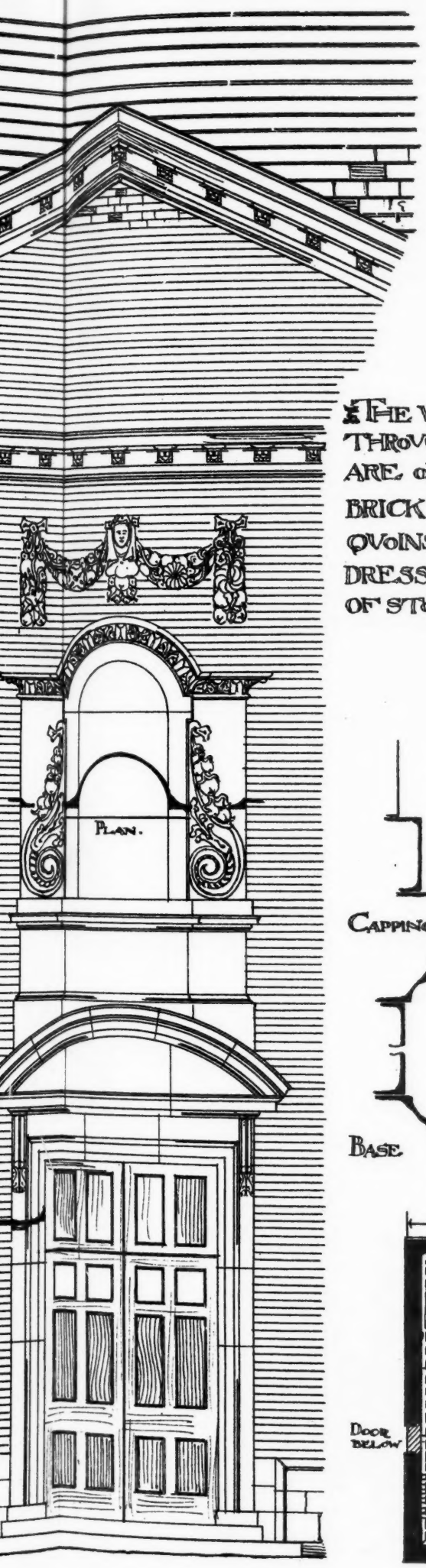
FEET

SCALE OF FEET FOR ELEVAT

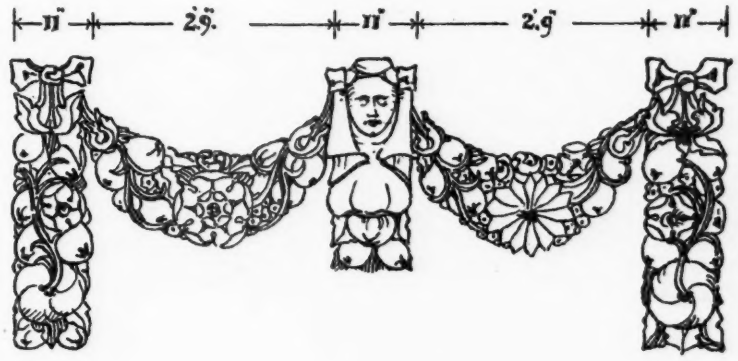
PHOTO-LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

DETAILS OF GREAT HALL, W

(From Belcher & Macartney's "Late



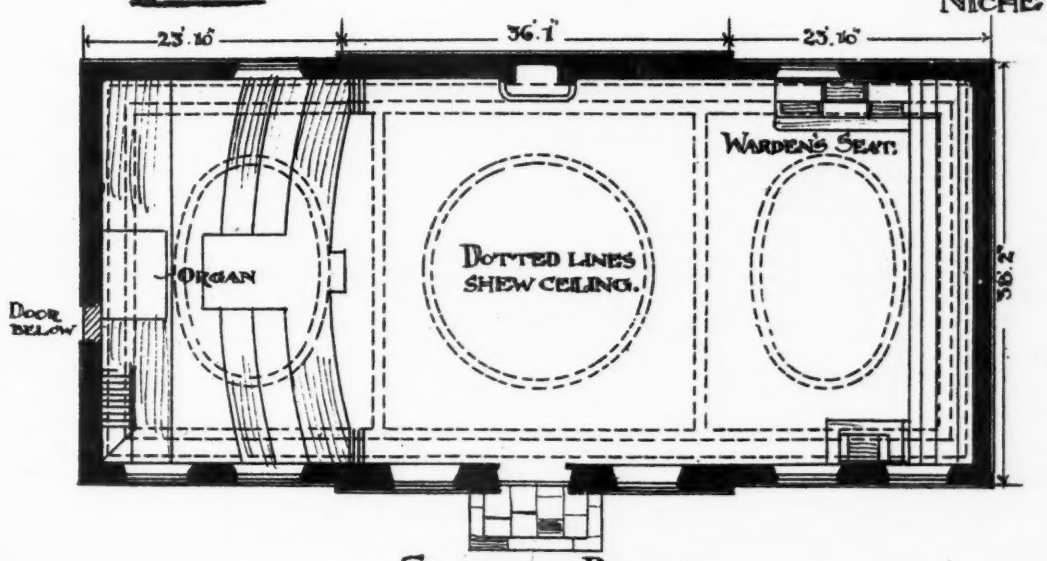
THE WALLS THROUGHOUT ARE OF RED BRICK WITH QUOINS AND DRESSINGS OF STONE.



DETAIL OF SWAG OVER CENTRAL WINDOW: THE OTHER TWO DIFFER SLIGHTLY.

DETAIL OF SWAGS OVER SIDE WINDOWS. SEE PLAN.

DETAILS OF NICHE ETC. OVER ENTRANCE.

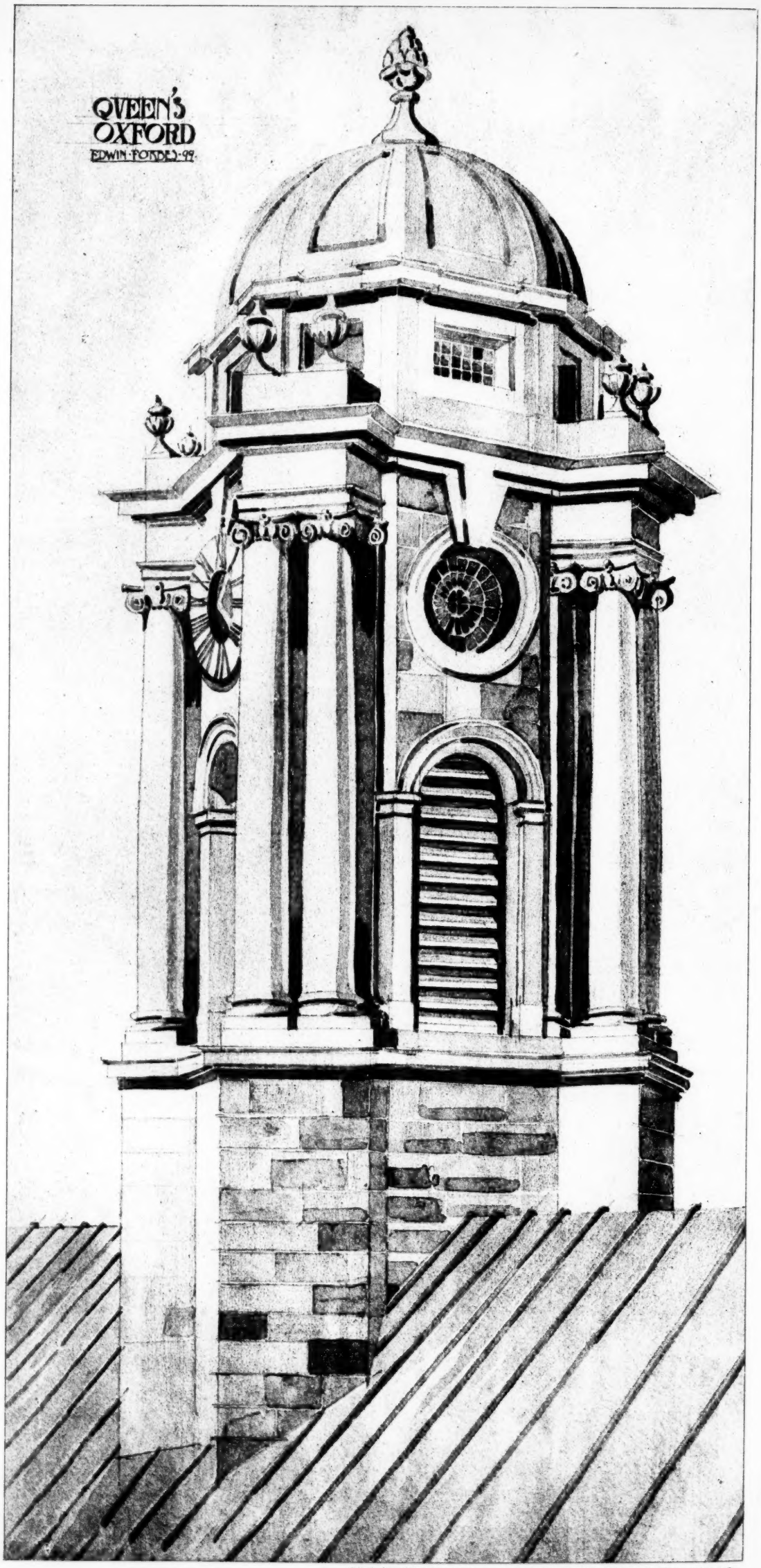


SKETCH PLAN.

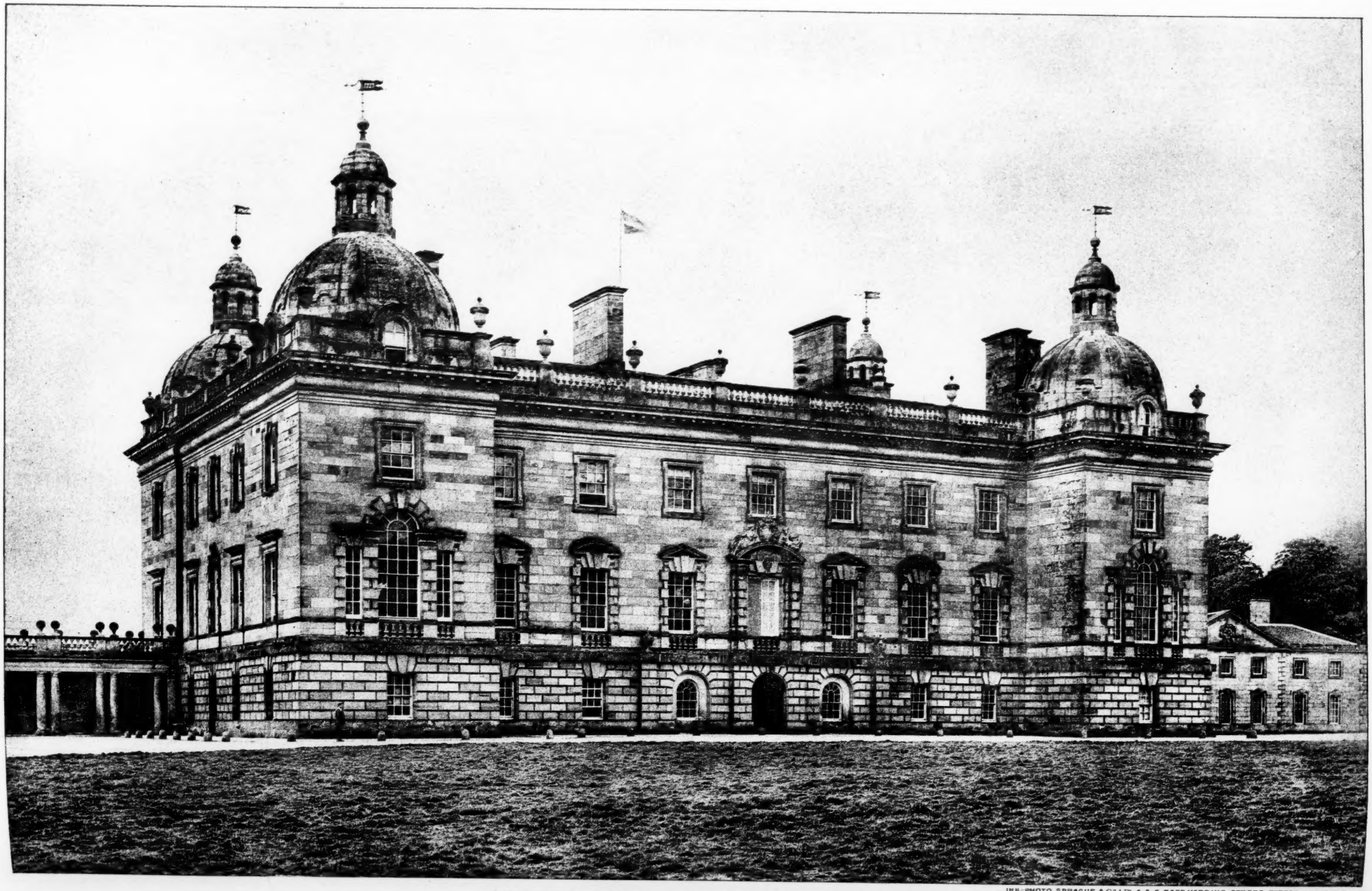
...Y OF PRINCIPAL FACADE: 1" 20 FEET.
...R ELEVATION.

A. Stratton del.

...AT HALL, WINCHESTER SCHOOL.
...acartney's "Later English Renaissance.")



INK-PHOTO, SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

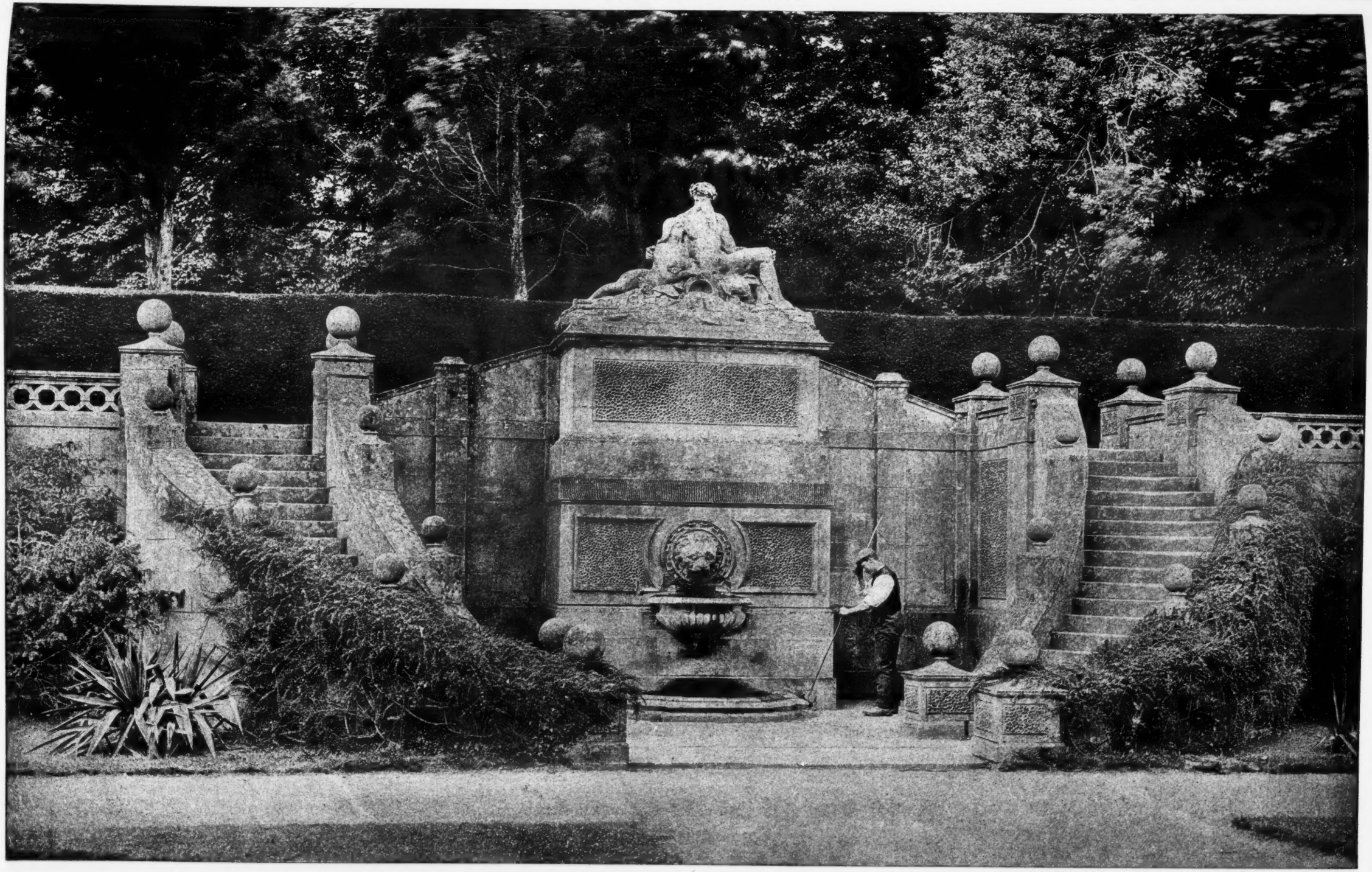


HOUGHTON, NORFOLK: THE ENTRANCE FRONT.
(From Fletcher & Macartney's "Later English Renaissance")

INK-PHOTO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

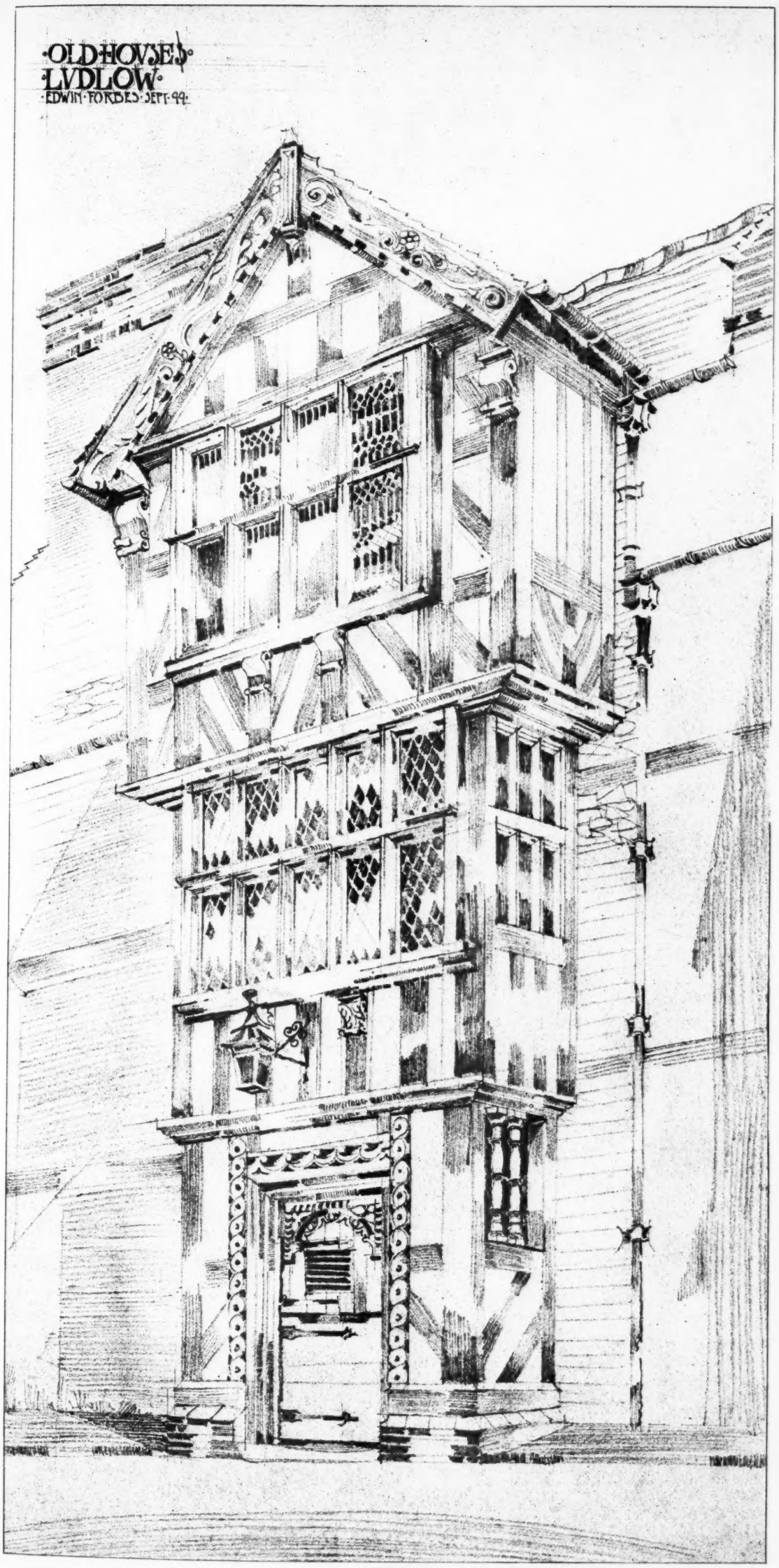
HOUGHTON, NORFOLK: THE ENTRANCE FRONT.
(From Belcher & Macartney's "Later English Renaissance.")

INK-PHOTO, SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.



INK-PHOTO, SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

MURAL FOUNTAIN, BOWOOD, WILTS.
(From Belcher & Macartney's "Later English Renaissance.")



INK-PHOTO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.